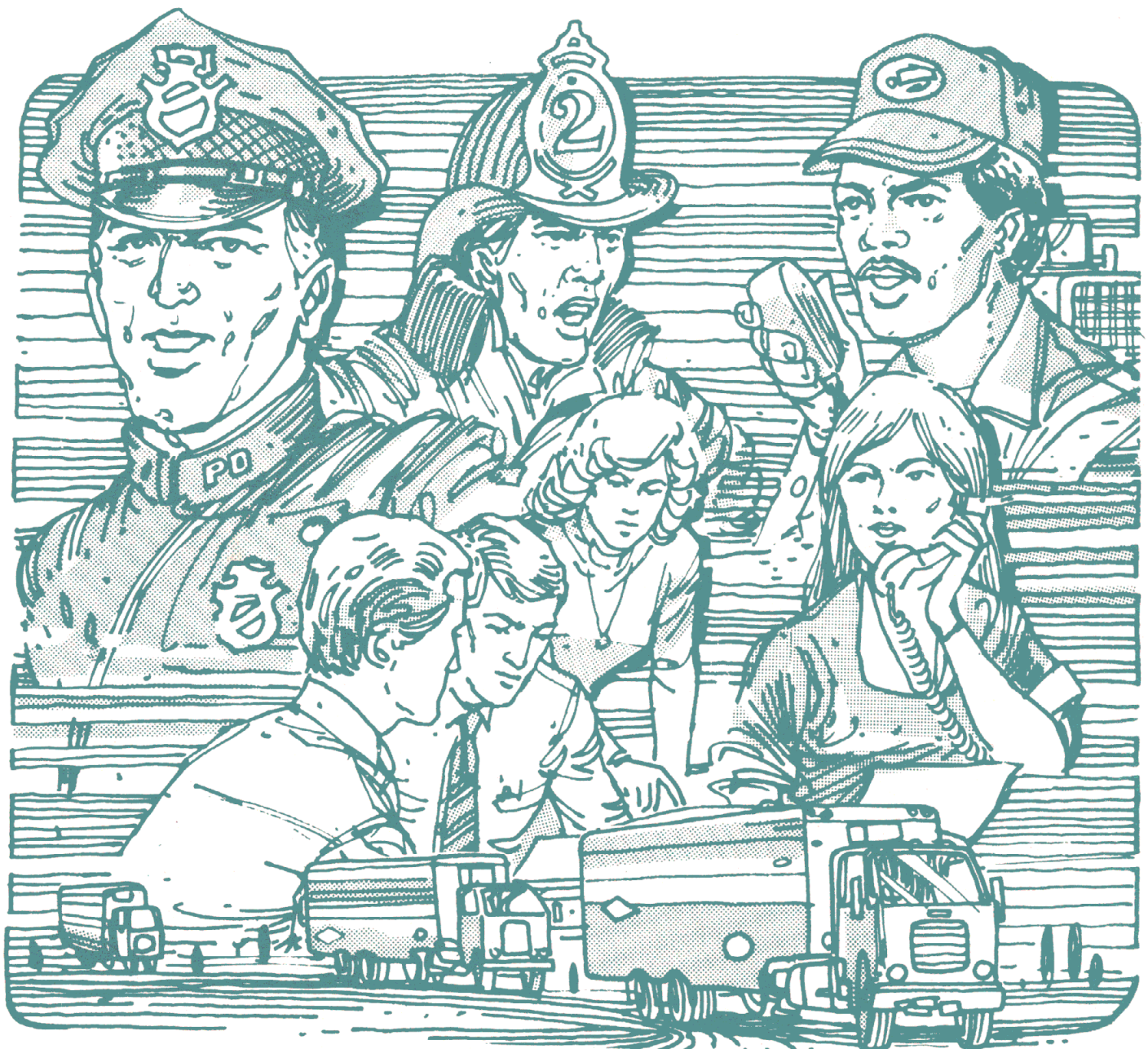




U.S. Department
of Transportation
Research and
Special Programs
Administration

Community Teamwork: Working Together to Promote Hazardous Materials Transportation Safety

A Guide for Local Officials



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Prepared for

**US Department of Transportation
Research & Special Programs
Administration
Materials Transportation Bureau
Washington, DC 20590**

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May 1983

Contract DTRS5681-C-00042

Acknowledgements

This document was approved for publication by the U.S. Department of Transportation under Contract No. DTRS5681-C-00042. Special thanks are due to the Information Services Division, Materials Transportation Bureau, and to the many state and local officials who were willing to share their experiences with the project team. The efforts of the following people in reviewing portions of the material are especially appreciated:

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The statements and conclusions expressed in this publication are those of the contractor and do not necessarily reflect the official views of the U.S. Department of Transportation. In addition, the U.S. Department of Transportation assumes no responsibility for the accuracy or completeness of the information herein.

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Preface

Since its creation in 1967, the U.S. Department of Transportation has had as one of its primary goals the protection of the public from the risks associated with the transportation of hazardous materials. In recent years, states and localities have also become aware of these risks and, in many cases, have established their own programs in this area. However, resources available to all levels of government have become scarcer in recent years. Thus, it has become increasingly essential that the various levels of government work closely together to assure that the public is provided the highest level of protection possible.

In recognition of this need, the Department has undertaken a number of efforts to assist states and localities in enhancing their roles in protecting the public. This document represents one such effort. Its purpose is to provide state and local officials with guidance on the most efficient use of their limited resources to develop effective hazardous materials programs.

Another of the Department's activities has been to provide funding and technical assistance. A number of state and local governments have used these resources to develop hazardous materials transportation programs. These governments—the state of Massachusetts; the cities of New Orleans, Memphis, and Indianapolis; the Association of (San Francisco) Bay Area Governments; and Niagara County, New York—went through processes and established programs similar to those described in this document.

The Department is in the process of summarizing these projects for other states and localities that may wish to undertake similar efforts. That document will be a companion to this one. It will discuss in detail how the types of activities described in this document have been implemented. It will include experiences of a variety of governments of different sizes and with different degrees of exposure to hazardous materials.

In the future, the Department intends to continue to assist state and local governments in developing programs by providing technical assistance. From time to time, additional guidance documents on specific issues related to such development will be published.

It is hoped that, through these and other efforts, a sound partnership among the various levels of government can be developed and strengthened. The result will be enhanced public safety—an essential goal for all governments.

Comments, suggestions, and/or corrections should be mailed to: U.S. Department of Transportation, Information Services Division, DMT-11, 400 Seventh Street, S.W., Washington, D.C. 20590.

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Introduction

Purpose

This Guide is designed to provide ideas on how to develop a hazardous materials transportation safety program at the most economical cost. Examples are presented of different state and local agencies sharing the cost of providing labor, equipment and materials. Ways in which private industry have supported state/local safety programs are illustrated. Publications and other sources of information are also identified to help you:

- maximize the use of available federal, state and local resources, and increase inter-agency cooperation;
- consolidate hazardous materials transportation activities with other state/local programs;
- expand the use of mutual aid arrangements;
- maximize the use of part-time and volunteer staff; and
- encourage greater local industry involvement in hazardous materials incident prevention and emergency response activities. Local industry is a valuable source of technological expertise, emergency response equipment and containment materials.

State or local fire, police, emergency service/civil defense, transportation, public safety and environmental protection officials will find this Guide helpful. Some agencies and organizations have already adopted some of the cost-cutting measures and management practices which are identified. Certain actions may not be appropriate because of the institutional, organizational or financial conditions peculiar to a particular area and/or the agencies, organizations and companies potentially involved. However, if this Guide identifies one or more new opportunities, it will have accomplished its primary purpose.

The Need for Practical, Inexpensive Transportation Safety Programs

The responsibility for, and costs of providing, hazardous materials transportation safety programs are now shared by a partnership of Federal, state, and local government and industry. Table 1 summarizes

the type of resources typically provided by different levels of government and industry. In general, the Federal government develops regulations for transportation safety and incident prevention, while local government and private industry resources are used for

Table 1

Federal Government

- legislative authority and supporting regulations
- container manufacturer, shipper and carrier inspection/ enforcement personnel
- emergency preparedness planning guidance
- specialized emergency response personnel and equipment
- expert technical information
- training courses, manuals and materials
- financial assistance

Industry

- specialized emergency response personnel (volunteers), equipment and materials
- expert technical information
- training courses and materials
- financial assistance

State Government

- legislative authority and supporting regulations
- hazardous materials shipper and carrier inspection/enforcement staff
- intergovernmental coordination and management skills
- specialized emergency response personnel and equipment
- financial assistance

Local Government

- regulatory authority
 - familiarity with local movements of hazardous materials
 - extensive emergency response capabilities: manpower, equipment and materials
 - financial assistance
-

emergency preparedness activities and actual spill response. State agencies provide some hazardous materials inspection/enforcement resources, targeted primarily at hazardous materials tank truck carriers. States also play a major role in coordinating the emergency response resources provided by others. Some states provide for the clean-up of spills when Federal and industry resources are not available.

Programs to improve hazardous materials transportation safety must compete with an ever-growing number of government programs for funding and support. At the same time, rising personnel and equipment costs make it difficult to continue and expand existing safety programs or establish new ones. Cost-cutting actions and improved management practices are, therefore, critical to the development of any hazardous materials transportation safety program. The importance of moving hazardous materials safely requires that special attention be given to practical, low cost ways of providing these essential services.

Organization of this Guide

The material in this Guide is organized into five sections, corresponding to the following five subject areas:

Section**1 Hazards Awareness**

How to become aware of the hazards, vulnerability, and risks posed by the transportation of hazardous materials.

2 Emergency Response

How to obtain and mobilize equipment, materials and personnel to respond to hazardous materials transportation incidents.

3 Inspection and Enforcement

How to improve hazardous materials inspections.

4 ***Training and Education***

How to obtain adequate hazardous materials training and education programs.

5 ***Legal Authority***

How to obtain adequate legal authority to inspect hazardous materials carriers and respond to hazardous materials spills.

The discussion in each of these sections contains (a) an overview of the problem, (b) a description of the resources needed to address the problem, and (c) ideas on how to obtain the needed resources on a limited budget. There are also two appendices. Appendix I contains a list of reference materials which can be consulted for additional information in each of the five subject areas. Appendix II contains a series of exhibits which provide more detailed information to support the discussion in each of the sections.

1

Hazards Awareness

Overview

Accidents that occur during the transportation of hazardous materials present unique dangers to human life, property and the natural environment. A **hazards assessment/risk analysis** provides an awareness of the problems that may arise during the transportation of hazardous materials. It is a key element or starting point of every emergency response plan. It indicates:

- the kinds of hazardous materials and transport modes likely to be involved should an accident occur;
- the types of hazards (e.g., fire, explosions) most likely to accompany hazardous materials spills;
- the type of emergency response equipment, materials and personnel that should be available;
- where the equipment and material should be located so that the response time in getting to potential spill sites is minimal;
- the type of training that emergency response personnel should have;
- the general locations or travel routes that present unusual risks and/or should receive some "corrective attention;"
- the most direct, and least congested, routes for getting emergency response equipment and personnel to the scene of a spill;
- safe and effective evacuation routes should they become necessary;
- the factual information necessary to support funding requests for hazardous materials transportation safety programs.

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Many states and communities try to prepare and equip themselves for **all** kinds of hazardous materials emergencies. **Don't commit valuable resources until a hazards assessment is performed and the problem is really understood.** A hazards assessment can be made without spending a lot of time or money. A great deal of useful information is already available from a number of federal, state and local agencies, and industry. If not readily available, information on the movements of hazardous materials can be inexpensively obtained by either (a) collecting the information as part of other ongoing data collection programs, (b) using part-time or volunteer personnel to conduct limited surveys, and/or (c) seeking industry funding and support.

Definition of a Hazards Assessment/Risk Analysis

A hazards assessment/risk analysis consists of (1) obtaining information on hazardous materials, population density and environmentally sensitive areas, (2) mapping the data collected, (3) determining the types of hazards present, (4) identifying vulnerable areas, and (5) calculating the risks. To perform a hazards assessment, information should be collected on:

- **the types and quantities of hazardous materials being transported in the area;**

Are large quantities of gasoline and fuel oil the major concern, or relatively small packages of low-level radioactive materials? Small quantities of select materials are often more toxic and dangerous than large quantities of other chemicals.

- **the transport modes and container types used;**

Which modes are used: tank truck? rail tank car? waterborne vessel? aircraft? pipeline?

- **the routes travelled, time of day and frequency of their movements;**

How do these shipments reach their destinations? If moved by truck, do they travel on interstate highways, urban arterials, or local roads? Are shipments made primarily during particular periods of the day?

- **the hazards associated with the materials being transported;**

Is it dangerous to human health, property and/or the environment? Are the chemicals explosive, flammable, combustible, corrosive, poisonous or radioactive? Are they liquid, solid or gas?

- **the vulnerability of the area to damage should an accident/incident occur;**

How susceptible are major population centers, special facilities (schools, hospitals), public/private buildings and environmentally sensitive areas (aquifers, reservoirs)?

- **the risks associated with the movements of different materials by different modes.**

What are the chances that a spill will actually occur in the future? Have the travel routes now being used been the scene of accidents in the past?

More detailed descriptions of hazard assessments are provided in the publications listed in Appendix I.

Performing a Hazards Assessment/Risk Analysis on a Limited Budget

Little data may be available to indicate the amount of hazardous materials movements into, through, or from an area. Exhaustive surveys of area transporters, and of industries known to use hazardous materials, are extremely expensive and time-consuming. Few states or municipalities have conducted these kinds of extensive surveys. Where data are available, it usually relates to (1) special materials moved frequently in small quantities (e.g., radioactive shipments), or (2) movements of hazardous materials by select modes (e.g., rail).

However, risk analyses do not need to be extremely detailed and costly to be useful.

Collecting **precise** information on **every** chemical and **every** movement in an area could easily exhaust a budget. Complicated risk analyses that rely on complex mathematical models and result in estimates of probabilities are expensive to perform because they require detailed data and (sometimes) the services of safety experts. Moreover, they have to be continually updated as industry and transportation services change in the area. However, a rough analysis or assessment can be valuable in determining what to expect and where to look for potential hazardous materials problems. In preparing such an assessment:

- Focus on the general classes of materials (e.g., flammable liquids, corrosives, radioactive materials) being transported. Don't become overly concerned with specific chemicals unless large quantities are stored, shipped or generated in the area.
- Identify the major transport corridors. Don't become overly concerned with identifying the specific routes used by different modes, particularly movements by truck. Your local authorities may be able to supply this information.
- Describe the risks in subjective terms (e.g., low, moderate, high). Don't become overly concerned with estimating precise probabilities based on a complex mix of different factors. However, relate the low, moderate and high ratings to emergency response needs, such as gallons of AFFF (light water, foam concentrate), self-contained breathing units, number of air bottles, specialized equipment, etc.

Adhering to these general guidelines will keep the costs of performing a hazards assessment low. Other ways to minimize costs include: (1) identifying and using information available from Federal, state and local agencies, and industries, (2) incorporating hazardous materials inventories into ongoing data collection/inspection programs, (3) utilizing part-time or volunteer personnel to conduct limited surveys, and/or (4) seeking local industry support. Also, **keep your inventory of information current**—personnel and resources can change rapidly.

Use Information Available From Federal Agencies

To assist in determining **what chemicals are hazardous**, obtain a copy of the **Code of Federal Regulations** (CFR), Title 49, Transportation, Chapter I, Research and Special Programs Administration, DOT, Parts 100-199. Part 172 of this title of the CFR identifies all of the materials that have been designated as hazardous for purposes of transportation. Copies are available from the Office of the Federal Register, National Archives and Records Service, General Services Administration, Washington, DC; or by calling the Government Printing Office. **(202) 275-2091**

For information on **the hazards associated with different chemicals**, consult the publications listed in Appendix I.

The Federal Hazardous Materials Regulations require industry to report all accidents involving hazardous materials in interstate transport. This information is available for a nominal fee from the DOT/Materials Transportation Bureau. It may assist in the **risk determination** portion of an assessment by identifying the modes of transport and locations that present (on the basis of historical record) a particularly high risk. Exhibit 1-1 in Appendix II indicates the type of accident data that are available. Several of the publications listed in Appendix I will also be useful:

For detailed information about **the causes of specific accidents**, the National Transportation Safety Board of Accident Investigation investigates many hazardous materials transportation incidents and publishes its findings. A list of NTSB investigation reports is available free from any regional NTSB office.

To assist in identifying **hazardous materials movements by water**, the Army Corps of Engineers regularly compiles and publishes information on the types and quantities of commodities (including hazardous materials) transported into and through all major waterways and harbors in the U.S. This information is contained in the publication, "Waterborne Commerce of the United States." Copies of the publication appropriate for your area can be obtained from the District or Division Office of the U.S. Army Corps of Engineers nearest you. Exhibit 1-2 in Appendix II provides a sample of the kind of information that can be derived from this publication. In addition, the U.S. Coast Guard maintains records of hazardous material accidents/incidents called into the National Response Center.

For help in identifying the **movements of hazardous materials by air**, contact the regional office of the Federal Aviation Administration (FAA), Civil Security Division. Hazardous materials shipments by air are tightly controlled by the FAA, and account for less than 3 percent of the total hazardous materials tonnage moved nationwide. The FAA has conducted limited surveys of hazardous materials shipments at major airports throughout the country and will provide the results. If not available from the FAA, the information can be obtained directly from the contract freight carriers operating at the airports of concern.

In general, commercial air shipments of hazardous materials are relatively small in size and usually less hazardous than the fuel carried onboard the aircraft. Estimates of the number of hazardous materials packages carried by military aircraft will generally **not** be available. Another source is the Air Transport Association of America.

The Nuclear Regulatory Commission (NRC) requires under the Nuclear Regulatory Commission Appropriation and Reauthorization Act of 1980 that Governors or their designated alternates be prenotified when large-quantity radioactive wastes and spent nuclear fuel shipped in DOT Type B packages are to be transported through their state. This exists as a source of information on the **movements of high-level radioactive waste and spent fuel** by truck. The designated contact for the NRC in each state can provide information on radioactive shipments.

The U.S. Geological Survey Distribution Branch, (1200 South Eads Street, Arlington, VA 22202) and the U.S. Defense Mapping Agency can provide various scale **topographic maps**. The U.S. Department of Commerce, Bureau of the Census, can provide **census tract maps**. Population and employment data are also available from the Bureau of the Census. Guidance on how to use topographic maps and wind data can be found in the National Transportation Safety Board, "Standardized Maps for Hazardous Materials Accidents," Special Investigation Report No. NTSB-HZM-79-1. [NTIS] **Aerial photographs** are also available from the U.S. Geological Survey.

Use Information Available From State Agencies

Pre-disaster planning has already been done in virtually all states for other kinds of emergencies. Some states have done planning for hazardous materials emergencies. Contact the State Fire Marshal and Civil Defense Director on the status of these planning efforts. Other state agencies can be contacted if these individuals and agencies do not have the desired information.

State agencies responsible for overseeing public utilities will typically have up-to-date information on the **location of all major pipelines** in the state. The companies responsible for operating these lines can then be contacted directly for information on the types and quantities of materials they transport.

State and Federal EPA offices have lists of **hazardous waste dump sites** (legal and illegal).

The State Office of Planning, or its counterpart, may have **population density data and maps**.

The State Department of Transportation (DOT) can provide reasonably scaled **maps of the roadway network**. They can also provide traffic counts of the number of vehicles using select roadways on a typical day. The State DOT will also know the operators of the **rail lines** that travel through the state and your area. Then contact the railroads directly for information on the type and quantity (carloads) of hazardous materials they have moved in recent years. If available, way-bill information can be used to identify the specific rail lines used by the railroad to transport

specific hazardous commodities. Exhibit 1-3 in Appendix II indicates the type of information that can often be obtained.

The State Motor Vehicle Department may have **accident data files** that are useful in identifying high risk roadways. Fuel tax reports and records of operating certificates will also be available from the motor vehicle agency to use in identifying the major carriers domiciled in your area.

Topographic and other environmental data can usually be obtained from any number of different state agencies: Department of Environmental Protection or Ecology, Public Health Department, Department of Agriculture, Pesticide Board, Fish & Game Department.

Lastly, the Resource Conservation and Recovery Act of 1976 (RCRA), gave many states the authority to develop and adopt regulations that require all hazardous waste truck transporters to submit monthly reports describing the volume and types of wastes they are handling. Find out who is responsible for tracking hazardous waste manifests in your state. As this requirement for "hazardous waste manifest" systems is implemented, reliable information on the **movements of hazardous wastes** will become available. Remember, however, that manifests are required only for **waste** transporters, and not for transporters who carry (raw) hazardous **materials** or products. To learn what is contained in a hazardous waste manifest, see the **Federal Register**, "Uniform Hazardous Waste Manifest: Joint EPA/DOT Proposed Rule," Thursday, March 4, 1982, pp. 9336-9347.

Use Information Available at the Local Level

Usually, the most important source of information at the local level will be the local fire department and civil defense agency. The **fire department**—as part of its inspections of area companies—and the **civil defense agency**—as part of its disaster plan preparation—may have already collected much of the information needed for a hazards assessment. **They should be the first people to call to begin a data collection effort.**

Several municipalities have imposed **prenotification requirements** for select hazardous materials. Seattle, for example, has had rather strict prenotification and routing restrictions in effect for some time. Prenotification requirements exist as important sources of hazardous materials transportation data, even though they are typically limited in the materials and modes of transport to which they apply. The local Fire Department, Department of Health, or Department of Traffic is usually responsible for enacting and monitoring such prenotification ordinances.

Local industry directories exist as yet another important source of data, particularly when a comprehensive industry survey is prohibitive. Directories that identify the locations and major products produced by different types of manufacturing industry are available for 43 states from MacRae's Blue Book, Inc., 87 Terminal Drive, Plainview, NY 11803. By knowing the industries that typically use hazardous materials (see Exhibit 1-4 in Appendix II), the major location of hazardous material/waste storage sites can be identified from the directory listings, plotted and mapped. Because the hazardous materials produced and used by industry must almost always be transported from one location to another, this information also indicates by inference the relative magnitude of hazardous material shipments in different areas (particularly by truck). Inferences can also be made regarding the types of materials being transported (see Exhibit 1-5 in Appendix II). Although general in nature, this data can help you create an overall profile useful for emergency response planning and resource allocation.

Combine a Hazardous Materials Inventory Effort With Other Ongoing Data Collection or Inspection Programs

Existing information is likely to provide all that is needed to identify the movements of hazardous materials by rail, air, water and pipeline. However, additional information may be necessary on hazardous materials truck movements in the area. A limited survey of the users and transporters of hazardous substances in the area may need to be conducted.

To conduct this survey as inexpensively as possible, utilize existing administrative structures and personnel. Spare yourself the expense of establishing a separate—

and often duplicative—data collection system. Local fire department personnel, for example, routinely inspect area businesses and industries for compliance with state and local safety codes. Given the proper authority, the inspection of select industries could include the collection of transportation-related hazardous materials data, perhaps as part of an existing permit process. Be aware, however, that some state statutes prevent the consolidation of certain program activities. Collective bargaining agreements may also prove to be a stumbling block.

Also, do **not** expect all of the companies surveyed to readily offer hazardous materials information. Most private industries that deal with hazardous chemicals are reluctant to provide substantial information about their operations and the materials they use. Exhibit 1-6 in Appendix II provides a sample of the kind of information obtained by the Memphis (Tennessee) Fire Department from companies in its district. The detailed information shown in Exhibit 1-7 (Appendix II) may be obtained if non-disclosure agreements are reached. A non-disclosure statement simply states that none of the detailed information collected will be released on a firm by firm basis. These agreements permit the use of the data collected in statistical summaries only. Once again, it is worthwhile emphasizing that exact and highly detailed information is not essential for a hazards assessment. North Charleston, South Carolina Fire District personnel inventoried their relative risks, for example, by canvassing their area and taking 300-400 color slides of local facilities and situations.

Employ Part-Time or Volunteer Personnel to Conduct Limited Surveys

If existing staff are unavailable to determine hazardous materials truck movements, the use of part-time or volunteer staff should be explored. Volunteers can easily count the number of trucks travelling a particular roadway that display different hazardous materials placards. If volunteers cannot be found, local employment agencies or skill bureaus can provide relatively cheap labor who, with a minimum of training, can also perform truck counts. These counts should be made during a 12-hour period on a typical weekday, or on a 24-hour basis if you suspect that many truck shipments occur at night. To aid in understanding the different placards, obtain a copy of **DOT's**

Hazardous Materials Warning Placards

available free from the Information Services Division, DOT/Materials Transportation Bureau, 400 7th Street SW, Washington, DC 20590. A form like that shown in Exhibit 1-8 in Appendix II can be used to record the information collected. The following example illustrates how one survey was conducted on a statewide basis.

Example: Virginia highway survey of hazardous materials carriers

In Virginia, eight thousand trucks were inspected at 38 locations to obtain information on the movements of hazardous materials by highway in the state. Stops were made with the assistance of state and local police at weighing stations along the interstate highways and at strategic locations on primary roads. Once informed of the purpose of the stop, the truckers' shipping papers were reviewed and the amount and type of hazardous materials being carried documented. The drivers were then interviewed to determine where they had come from, where they were going, and what routes they were taking to get there. These interviews provided information on the proportion of trucks carrying hazardous materials by route section. This information was then merged with available data on average daily truck traffic and truck accident rates to provide an estimate of the number of accidents by route section and hazard class for trucks carrying hazardous materials in Virginia. For further information, contact the Transportation Safety Projects Office, Virginia Polytechnic Institute, Richmond, VA.

Seek Local Industry Funding and Support

Private industry is well-aware of the importance of a good hazards assessment. Many companies will offer to support efforts of this kind because they do not want:

- scarce public monies wasted;
- taxes increased;
- the public unnecessarily alarmed; or
- state or local prenotification regulations enacted.

In addition, industry involvement in such programs enhance their public image. One example of this type of involvement is described below.

Example: Subsidizing the activities of public agencies

In Santa Clara, California, local businesses pay a fee to support a special chemical division in the Santa Clara Fire Department. This chemical division, in turn, is responsible for implementing the Chemical Hazards Assistance Program, which includes conducting a chemical survey of every business in the City. The City is also considering development of a new survey of transport agencies to obtain "cradle to grave" tracking of all hazardous materials movements. Exhibit 1-9 in Appendix II describes the **Santa Clara Chemical Hazards Assistance Program** in greater detail.

Instead of contributing directly to a public agency, local industry can alternatively form an independent, not-for-profit corporation and do the hazards assessment. The primary advantage in forming such an organization is to overcome the mistrust that the public may have of the industry. An example of a nonprofit corporation that complies with appropriate state law and Section 501(c)(3) of the U.S. Internal Revenue Code appears below.

Example: Establishing an independent, non-profit corporation

The **Coalition for Safe Waste Management, Inc.** in Massachusetts exists as an example of a non-profit corporation formed by "pooling" industry resources. The Coalition was formed to carry out public education programs; to support or undertake studies and technical analyses; and to assist in the evaluation of proposals submitted by firms desiring to site a disposal facility in the Commonwealth.

To date, the Coalition has compiled an inventory of all generators and users of hazardous wastes by city and town in the State. The Coalition's staff is currently involved in encouraging hazardous waste generators in relatively small geographic areas to band together and work more closely with local officials to address their unique disposal problems. For copies of the Coalition's By-Laws, contact the Executive Director, Coalition for Safe Waste Management, Inc., 15th Floor, 50 Milk Street, Boston, MA 02109.

A similar, non-profit corporation could clearly be formed to (a) collect hazardous materials transportation data, (b) educate the public on how to identify haz-

ardous materials transporters, (c) report safety violations and spills.

2

Hazardous Materials Emergency Response

Overview

As first responders at the scene of a hazardous materials transportation spill, local public safety personnel typically have the lead responsibility for:

- determining what the materials involved are;
- determining the risk or hazard posed by the spill;
- mobilizing the resources necessary to monitor and contain the spill;
- preventing a dangerous public health situation from occurring (including evacuation if necessary);
- implementing fire and explosion prevention measures; and
- keeping the public informed of the hazard that exists, the actions being taken, precautionary measures to take, and evacuation routes and destinations (if necessary).

Handling hazardous materials incidents often requires significant training, specialized equipment and materials, and more coordination than other emergency situations. While large urban areas with full-time fire departments may have special teams and elaborate emergency response/communication vehicles, small volunteer fire departments often cannot afford such vehicles. Similarly, some departments may have ample supplies of a variety of chemical suppressants, while others have few or none.

It is not feasible or practical for **every** local fire, police and emergency service organization to be fully equipped and staffed to respond to **every** conceivable hazardous materials emergency. In addition, it is difficult to justify spending large sums of money for special equipment and materials that are used infrequently. Nevertheless, a high level of emergency preparedness is desirable so that the potential destruction and injury from a spill can be minimized. How to obtain the equipment, materials and personnel necessary to handle hazardous materials transportation spills is one of the stiffest challenges faced by state and local officials.

To meet this challenge, state and local officials should first identify and use the equipment, materials and expertise already available from government agencies and industry. If additional assistance is needed, mutual aid programs can be established. Existing, under-utilized vehicles can also be converted and outfitted

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with inexpensive materials to serve as emergency response vehicles. Money can be saved by pooling resources with other communities and purchasing needed emergency response equipment or materials in bulk. Volunteers or civilians can be used to perform certain tasks. And lastly, industry can be approached for donations or loans of needed equipment or materials. It is also extremely important that your emergency response resources (including telephone numbers) be verified on a regular basis (monthly, semi-annually). Three o'clock on a Sunday morning is not the time to discover the information is incorrect and resources unavailable!

Necessary Equipment, Materials and Personnel

Before purchasing any emergency response "resources" (equipment, materials or personnel), find out what hazards are prevalent in your area. Know what kinds of equipment, materials and expertise are commonly used to deal with them. Use this information to determine:

- the specific kinds of equipment and materials that ideally should be available;
- where hazardous materials emergency response teams should be located;
- what quantities of equipment and materials are necessary, and
- training program to develop expertise.

A hazards assessment will identify the types of hazardous materials and transport modes prevalent. (See Section 1 of this Guide) Use these data to determine the specific equipment, materials and expertise that should be available.

Table 2-1 summarizes the broad categories of **equipment and materials** typically used to control and contain hazardous materials spills. Remember that each piece of equipment at the scene of a spill serves a well-defined purpose.

Trained personnel are also essential at the scene of a hazardous materials incident. Table 2-2 identifies the type of people likely to be of greatest assistance at the scene of a spill. Each type of person is capable of

bringing unique talents and skills to the emergency situation.

The specific equipment, materials and technical expertise you should have available—or have access to—requires careful study and extensive coordination among all levels of government and industry. Base your equipment and material purchases on sound technical information. For more detailed information on the equipment, materials and methods needed to combat different hazardous materials incidents, see the reference documents listed in Appendix I.

Obtaining and Mobilizing Emergency Response Resources on a Limited Budget

There are a number of ways to supplement existing resources and maintain an adequate level of emergency response preparedness without spending large sums of money.

Federal, state and local governments, as well as private industry, already have many programs in operation for responding to hazardous materials incidents. These programs may be able to fill the gaps in your response effort. Knowing the capabilities of other agencies and industry also prevents wasteful duplication of effort.

Use the Response Aid Available at the Federal Level

While the Federal government can provide emergency response resources through the **Coast Guard** (for coastal incidents) and **EPA** (for inland releases), these resources are limited and vary regionally. It is therefore important to discuss your needs and their capabilities with local EPA and/or Coast Guard staff. They can advise you on:

- the type and location of the emergency response equipment and personnel they can offer;
- how to devise a workable emergency response plan;
- the availability and use of computerized data bases and written manuals on hazardous materials;

Table 2-1 Basic Equipment and Materials Used in Hazardous Materials Incidents

Item and Examples	Function	Comments
Personal Protective Equipment <ul style="list-style-type: none"> • Pressurized Self-Contained Breathing Apparatus (SCBA) • Full Protective Clothing • Special Protective Clothing 	Protects emergency response personnel against toxics, fire, and/or explosion.	Exact type of clothing or apparatus needed depends upon specific hazard approached. Essential for hazardous materials work.
Communications <ul style="list-style-type: none"> • Radios, Telephone, Megaphones 	Improves coordination among emergency response personnel.	Insure that equipment is compatible. Basic fire radios are a necessity. Walkie-talkie and megaphones will also ease communications at the scene of the spill.
Environmental Monitoring <ul style="list-style-type: none"> • Water pollutant detectors • Airborne Gases/Chemical Monitors • Optical (binoculars, lamps) • Radiological Monitoring Equipment 	Determines extent, severity and nature of hazard.	Needed to identify factors (e.g., wind direction and speed) that might affect the emergency response operations. Explore resource sharing with nearby towns, industry.
Fire-Fighting Equipment <ul style="list-style-type: none"> • Trucks/Apparatus • Tools & Equipment • Foam/Agents • Dry Chemical Extinguishers • CO₂ Extinguishers • Foam Application Equipment 	Extinguishes fires; reduces explosion hazard; reduces the flow of vapors, toxic or dangerous materials; necessary to carry out rescue and evacuation.	Usually needed to combat large spills, rescue trapped people and protect environment. Explore Mutual Aid with adjoining fire companies.
Sorbents <ul style="list-style-type: none"> • Natural (vegetable, mineral, animal) (e.g., dirt) • Synthetic (polymers) (e.g., polypropylene) 	Sorb materials used to reduce hazards and ease cleanup.	Sorbents are inert, non-toxic solid materials that soak up spills or convert the spilled liquids into a semi-solid mass. Easier and safer to clean up spill.
Construction Equipment <ul style="list-style-type: none"> • Backhoes, cranes, bulldozers, dump trucks, etc. 	Used to construct dikes, collection ponds and trenches to contain material. Clear wreckage.	Explore resource sharing with local contractors or builders, etc.
Chemical Agents	Neutralizes or otherwise chemically reduces hazard.	Example: Lime neutralizes some spilled acids. (Get trained!!! Be safe—not sorry.)
Containment Devices	Reduces spread of hazardous materials.	Examples: patches, plugs, booms, foam, etc.
First-Aid Equipment	Necessary to treat victims of exposure to hazardous materials.	Example: dressings for chemical burns. Supply of clean water to rinse off hazardous chemicals.

Table 2-2 Personnel Involved in Hazardous Materials Incident Response

Function	Location	Comments
Firefighters	Local Fire Departments Regional and State Fire Groups/ Agencies Industrial Fire Brigade	All firemen are trained in fighting structure fires. However, not all firefighters are trained in fighting fires involving hazardous materials.
Operators of response equipment	Private Industry: emergency response equipment owners will generally be the best source of equipment operators Response and Cleanup Contractors	The operation of response equipment often requires special training. If you arrange for equipment loans from other communities or industry, try to arrange for a skilled operator as well.
Public Safety	State and local police, highway patrol National Guard County Sheriff Industrial Security Forces Civil Preparedness Office	Public Safety personnel provide for traffic control, crowd control and property protection at the scene of a spill.
Meteorologists	State and Federal Response Teams Local TV and Radio Stations Airport Weather Facilities Universities National Weather Service Nuclear Power Plants	If poisonous or toxic gases are released, meteorologists can calculate the concentration of the gases in surrounding communities and the expected duration of exposure.
Public Health Specialists	Local and State Public Health Agencies Universities	Doctors and public health officials are familiar with the properties of poisonous gases, toxic chemicals, petroleum products, radioactive materials and other hazardous materials.
Chemical Experts	Local Universities Local Industry State Environmental Agency	Personnel with expertise in chemistry can provide advice on the properties of the spilled material, the best control method, and any dangers posed by possible chemical reactions.
Environmental Scientists	State Environmental Agency EPA Universities US Fish & Wildlife Service US Geological Survey	Biologists, geologists, hydrologists and ecologists can project the movement of the materials and estimate the eventual impact on surface water and ground water.
Medical Personnel	Ambulance Services Hospitals Red Cross	Treatment of victims of hazardous materials incidents may require decontamination and other procedures not routinely employed. Proper training of medical personnel is important.
Evacuation	Civil Defense National Guard Red Cross Salvation Army Municipal Transportation Military	Civil defense professionals in many states and urban areas are currently developing "crisis relocation" plans for use in the event of nuclear attack. Their knowledge is readily applied to hazardous materials incidents.
Communications	Local Emergency Service Networks Civil Defense CHEMTREC Local TV and Radio Stations Amateur Ham Radio Club	Radio operators and telephone dispatchers will be especially important.

Note: It is imperative that personnel responding to hazardous materials incidents be properly TRAINED!

Example: the U.S. Coast Guard (USCG) maintains a **computerized inventory of oil pollution control equipment** by state and region called SKIM. They also have an extensive, computerized data base on numerous **chemicals**, their **dispersion characteristics**, and **proper response methods**. The U.S. Environmental Protection Agency (EPA) regional offices also maintain a computerized data base on more than 1200 **hazardous materials** and **lists of laboratories** which can identify hazardous materials.

- the availability of contractors to assist in emergency response;
- the use of the Federal "Superfund" to finance emergency clean-ups;
- how to tap the technical knowledge and experience of Federal staff to choose the best response method.

For further information, contact the USCG or EPA On-Scene Coordinator in your region. See Exhibits 2-1 and 2-2 in Appendix II for the location of the USCG and EPA office nearest you.

Response to radiological incidents falls within the purview of several agencies. There are several existing programs and others under development. In the event of a radiation emergency, Federal assistance is available through the **US Department of Energy**. The Federal Radiological Monitoring and Assessment Plan (FRMAP) provides technical guidance for coping with radiation emergencies. Under FRMAP, the United States is divided into eight geographical regions, each with a regional coordinating office. These areas and the telephone numbers for the regional offices are given in Exhibit 2-3 in Appendix II. Upon receiving an emergency call, the regional coordinator will get as much information as possible about the situation and will provide advice over the phone if appropriate. If the incident appears serious, a technical response team will be dispatched and the Nuclear Regulatory Commission notified. The response team will assess the hazard, recommend emergency actions to minimize the hazard, and notify the appropriate authorities. **Responsibility for cleanup rests with the shipper or carrier.**

Use the Emergency Response Resources Available at the State Level

A number of state agencies can also provide ready access to experienced personnel, equipment and materials. The **first step** is to determine which state agency acts as the clearinghouse for state aid during emergency situations—including those involving hazardous materials. This agency is usually the state department of Emergency Services, Civil Defense, State Police or Environmental Protection. The clearinghouse agency may have an inventory of the resources currently in state agencies. If not, work through the clearinghouse agency to learn:

- the types of equipment, personnel and materials available;
- the location of equipment, personnel and materials; and,
- the telephone number(s) of those with access to the resources. [It is important to have 24-hour access.]

The clearinghouse agency can put you in touch with the right people, and see to it that others know of the emergency response resources you are willing to share. Exhibit 2-4 in Appendix II indicates the type of assistance commonly available at select state agencies.

Use the Assistance Available From Local Government

Although expertise and advice is available from state and Federal agencies, it is typically far removed from the scene of a transportation spill. Local government agencies are generally capable of providing basic, non-specialized equipment and materials. The fire department usually takes the lead in equipping and staffing itself to deal with hazardous materials transportation spills, with support equipment and services coming from the police, public works, civil defense, and public health departments. Exhibit 2-5 in Appendix II identifies the contributions to emergency response that local officials can provide.

Use the Resources Available From Local Industry

Local industries which use or generate hazardous materials can often be tapped for assistance as well. Exhibits 2-6 and 2-7 in Appendix II list possible industry sources of equipment and personnel. In general, the larger the firm, the more likely it will be able to assist in an emergency. Important assistance may be available from:

- **Chemical companies**, which often have the equipment and personnel to respond to chemical spills;
- **Oil refining** and storage facilities, which may be able to assist at a spill of oil or gasoline;
- **Construction companies**, which can provide heavy equipment and operators when needed;
- **Transportation companies**, which can provide detailed information of the materials they carry, assist in evacuation, and may have trained personnel and specialized equipment; and
- **Pollution cleanup contractors**, which have specialized equipment and trained personnel. Although a fee will be charged for the services provided, professional cleanup contractors are often the best source of advice and physical assistance at a spill.

Remember, keep the list of contacts and telephone numbers **current**.

Use the Assistance Available From National Industry Organizations

In addition to local industry, assistance is also available through a number of national organizations. They are listed in Exhibit 2-8 in Appendix II. The most important of these is the Chemical Transportation Emergency Center (CHEMTREC), which was set up by the Chemical Manufacturers Association in 1971 to provide information and assistance to those responding to chemical or hazardous material emergencies. CHEMTREC operates in two stages: first, on receipt of information regarding the name of a chemical, it provides immediate advice on the nature of the product and steps to be taken in handling the early stages of the problem. Second, CHEMTREC promptly contacts the shipper of the material involved for more detailed information and appropriate follow-up, including on-scene assistance when feasible. Information on how CHEMTREC

works is available from the Chemical Manufacturers Association, 2501 M Street, N.W. 20037, or from DOT's Materials Transportation Bureau, Information Services Division, (202) 426-2301.

CHEMTREC: (800) 424-9300
(202) 483-7616 in Alaska and Hawaii
483-7616 in District of Columbia

The National Agricultural Chemicals Association (NACA) Pesticides Safety Team, provides advice for incidents involving pesticides and will dispatch a response team to the site if the situation warrants it. For further information, contact NACA, 1155 15th Street, N.W., Washington, D.C. 20005. CHLOREP, the Chlorine Emergency Plan, provides assistance at chlorine emergencies in the United States and Canada by means of telephone instruction to on-scene personnel or dispatching of trained teams to the site. For details, write The Chlorine Institute, Inc., 342 Madison Avenue, New York, NY 10017. CHLOREP, NACA, and FRMAP (described earlier) can all be accessed through CHEMTREC.

Set Up Mutual Aid Programs

Local agencies are able to provide most of the equipment and materials necessary to respond to small spills of the most common hazardous materials. If a specific piece of equipment or material is not internally available, however, it can usually be obtained from other nearby sources. A sample of survey forms used by the Memphis Fire Department to inventory the equipment, facilities and manpower available at area fire departments appears as Exhibit 2-9 in Appendix II. Having identified these sources, an arrangement can then be made to ensure that they are in fact made available at the scene of a spill. **A mutual aid program is an agreement among industries and/or government agencies to share specific equipment, materials or personnel in the event of a spill.**

Mutual aid programs have long been used to "stretch" emergency response resources, and come in many different forms. They can:

- be among public agencies and/or private companies;
- be established to serve any size geographic area;

- be concerned only with a certain kind of spill (e.g., oil) involving a specific transport mode (e.g., barge);
- be formal (written) or informal.

For a mutual aid arrangement to be successful, the participating parties should first agree—preferably in writing—on the **financial terms** of the arrangement. A mutual aid arrangement can be established on a cost-reimbursement basis or on a free-service basis. The issue of **liability** is also important. Unless otherwise specified, a mutual aid responder can be held liable for the assistance lent during a hazardous materials incident if found to be negligent in some way. Section 5 of this Guide discusses the issue of liability in greater detail. The mutual aid participants should also agree upon the **communications system and procedures** to be employed in notifying one another. Regular meetings and mock drills are typically used to maintain the readiness of mutual aid participants. While mutual aid agreements can temporarily expand your emergency response capabilities, know their limitations. Some firefighter unions are now using their bargaining powers to neutralize mutual aid pacts. For example, while most union contracts allow mutual aid apparatus, others will not allow unionized apparatus to be used by volunteer or call departments.

To demonstrate the enormous potential that mutual aid programs have, the activities of four different mutual aid arrangements are described below.

Example: Formal Mutual Aid Program

The **Mississippi Gulf Coast Regional Disaster Services Mutual Aid Agreement** exists as a **formal**, written mutual aid arrangement made between city and county officials to deal with hazardous materials and other disasters in the Gulf Coast region. Under the terms of this agreement, the involved parties agree to loan each other equipment and personnel, and waive all claims for compensation that may arise from losses or damages incurred in providing assistance.

Example: Informal Mutual Aid Program

The **Berkshire County (Mass.) Mutual Aid System** is an example of an **informal** mutual aid agreement between 28 police departments and 14 fire departments. This agreement provides a communications network to coordinate the notification of, and response to, emergencies in

Berkshire County (population approximately 150,000). Prior to 1980, separate fire and police communication networks existed in many of the county's towns. With the establishment of a Communications Center, all emergency situations are now handled centrally by dialing a designated emergency number. The Center, equipped with a radio transmitter, an antenna and two telephones is staffed on a 24-hour basis by four fulltime staff members. The Center maintains an inventory of the equipment and materials available from all fire departments, police departments, civil defense groups and military facilities in the County and can request their use if necessary under informal mutual aid agreements.

Example: Voluntary (Dues-Paying) Mutual Aid Program

The **Northern Ohio River Industrial Mutual Assistance Conference (NORIMAC)** consists of industries and utilities located along the Ohio River in the area between Moundsville, West Virginia, and New Martinsville, West Virginia. Members include: Olin Corporation; LCP Chemicals, Inc. of West Virginia; Ohio Power Company; Consolidated Coal Company; Burns & Roe Services, Inc.; PPG Industries, Inc.; Air Products and Chemicals Inc.; Mobay Chemical Company; Ormet Corporation; Consolidated Aluminum Corporation; Chesapeake and Potomac Telephone Company; Chessie Systems Railroad; and Ohio Edison Company. Associate members include: local and state police, US Army Corp. of Engineers (locks and dams), US Coast Guard, West Virginia Department of Highways and local hospitals and emergency organizations.

NORIMAC is intended to provide its members with assistance in the time of emergency or disaster. This assistance can be in the form of roadblocks and gas detection, fire fighting and spill control, medical assistance and transportation, maintenance equipment and technical expertise. NORIMAC also conducts quarterly practice drills to test its emergency response procedures and capabilities, and sponsors training programs throughout the year to upgrade the skills of its members. NORIMAC is an entirely voluntary organization whose activities are funded by annual dues (\$750-\$850) paid by its members (associate members do not contribute). The principle cost of running NORIMAC is the expense of a private phone system which amounts to approximately \$750/ month. The remaining funds are used for miscellaneous supplies and training.

A member company can activate NORIMAC by picking up the NORIMAC dedicated phone receiver and pressing an activation button for 15 seconds. This places him in contact with the other members and the West Virginia State Police. After contact is made, the member in distress can use the methods outlined within the NORIMAC Manual to request assistance. The State Police will contact other law enforcement agencies as needed. The associate members are contacted by the regular public phone system. In the event of a failure with either the NORIMAC or public phone system, communications are carried out through the law enforcement agencies radio communications system. Whenever there is a NORIMAC emergency, a law enforcement officer reports to the scene to assist and to handle any emergency communications which may be necessary. For more information on NORIMAC's activities, contact James Bronchik, PPG Industries, P. O. Box 191, New Martinsville, WV 26155.

Example: Conditional Mutual Aid Program

The **Channel Industries Mutual Aid** organization was formed in 1955 to coordinate emergency response capabilities in the general vicinity of the Houston (Texas) Ship Channel. Comprised of the Houston Fire Department, area industry, the Port Authority, the US Coast Guard, the Harris County Sheriff Department, and various volunteer fire departments in the Ship Channel area, CIMA membership now totals 84, all of whom must agree to a number of conditions before being allowed to join the organization. As a **condition** for membership, for example, each member must agree to:

- maintain personnel and equipment sufficient to control fires or emergencies of the type and magnitude which are likely to occur most often in their facilities;
- provide an emergency plan for activating the personnel and equipment within their facilities; (this includes procedures for requesting CIMA member assistance as well as for receiving aid from CIMA members);
- provide current lists of the personnel and materials that they can provide (e.g., fire truck and hose, ambulance and first aid supplies, fire department mutual aid radios, foam, towers and portable equipment, automotive and engineering equipment);
- participate in all practice drills of the organization;
- perform annual self-inspections;

- replace material used or damaged in the control of a fire or emergency;
- maintain effective radio communications on the CIMA NET. (Normally, this condition of members is met by establishing a two-way base radio.)

A special emergency service frequency has been assigned by the FCC to the City of Houston, Texas Department of Municipal Defense for use by CIMA. CIMA also has approval to operate on the statewide mutual aid frequency. For more information on CIMA, contact Fire Chief, Houston Fire Department, 410 Bagby Street, Houston, TX 77002.

Convert Existing Under-Utilized Equipment and Outfit with Inexpensive Materials

A mutual aid arrangement may not provide the pieces of equipment desired (or in the best location). Consider converting currently under-utilized equipment. The equipment and vehicles used to respond to a hazardous materials spill do not need to be new, elaborate and expensive. The essential requirements are that they be functional and reliable. Older, surplus equipment can often serve as well as new, custom-made equipment.

A new, fully-equipped hazardous materials emergency response vehicle can be quite expensive. Yet, it may be important to have a vehicle in which specialized hazardous materials equipment can be stored in one place, and used to transport personnel and equipment to the scene of the spill. Table 2-3 identifies a basic list of items that might be contained in such a vehicle. Some hazardous materials vans, however, will contain many more items. Exhibit 2-10 in Appendix II identifies the list of equipment in the Virginia Office of Emergency Services Hazardous Materials Emergency Response Van.

Many communities, however, have utilized their own know-how to develop an emergency response vehicle without large sums of money. The greatest cost savings have been realized through the purchase or conversion of a surplus vehicle. Additional, smaller savings have been realized by adapting other pieces of equipment not originally designed for use in emergency situations. The examples below identify how a number of communities have minimized their costs while acquiring the emergency response capabilities they desired.

Table 2-3 Minimum Inventory & Equipment for Hazardous Materials Vehicles

Foam (protein, AFFF & alcohol)
Nozzles & eductors
Reference Books
Emergency phone numbers, current telephone books & tools
Minimum of 2 proximity or entry suits
Assorted hand tools
Plug & patch kits
pH meter or tape
Explosive gas meter
Wind sock
Self-contained breathing apparatus & spare tanks
Radio (CB, fire, or police)
Area maps
Ladders, hose, forceable entry
Gas detectors
Recovery drums, brooms, shovels
Absorbent material
Spare valves, fittings, etc.
Piping material, drains (PNC pipe)
Chlorine kit(s)
Safety valve protectors
Papers, tags, pencils, grease pens, shipping tags, etc.

SOURCE: Tetor, Frederick, "Organizing a Hazardous Materials Response Team," **Fire Chief Magazine**, April 1981.

Examples: Converting existing vehicles into response vehicles

The Mt. Pleasant, South Carolina fire department used in-house know-how to inexpensively equip its hazardous materials unit. A reserve pumper was converted into a foam truck with storage space for hazardous materials equipment. The pumper can still be used for structural fire-fighting. An Army surplus jeep was purchased and repainted for use as a mobile command post. The jeep carries foam, protective clothing, tools, breathing apparatus, maps, reference books and other useful items. The team obtained a surplus tanker from the state and will use it to carry water to remote fires. Patches and plugs have been fashioned from scrap rubber and lumber. Arrangements have been made with the local waterworks to borrow chlorine kits when needed.

The **North Charleston, South Carolina** District Fire Department's Squad 10 hazardous materials response truck is a 1948 vehicle that previously mounted a generator and was used as a light plant before it was converted.

In **Normal, Illinois**, the Fire Department modified a 1972 reserve pumper into a specialized response vehicle, using the Town's Public Works Department facilities to complete body work on the pumper and repaint the vehicle in a high visibility chrome-yellow color. Special care was taken in this case to modify the vehicle so that the unit could retain its certification as a pumper while also serving as the emergency response vehicle. The Department's future plans call for the conversion of a modular ambulance into a communications and command vehicle to be used at major emergencies.

The **Multnomah County, Oregon** Office of Emergency Management has a hazardous materials response unit which was designed primarily to transport necessary equipment but also serves a secondary function of being a mobile command post and communications center for any type of emergency.

The **Denver, Colorado** Fire Department hazardous materials emergency response vehicle was fashioned from a ¾ ton van customized by fire department repair and carpentry shop workers with shelving, insulation and other adjustments.

The **Springfield, Illinois** Fire Department converted a 1957 Ward LaFrance pumper with 4,000 miles on it into what is now known as "Foam 1." The apparatus was completely rebuilt in the fire department shops and outfitted for less than \$6,000 plus labor. It carries 450 gallons of 3 per-

cent polar solvent liquid AFFF, a permanently mounted 2,000 gpm (water) deluge set, a two-inlet portable deluge set, two oscillating nozzles, eductors, nozzle tips, fittings, etc. A 1975 GMC van was also converted into a hazardous materials equipment and control vehicle that carries four acid suits, six positive-pressure-demand SCBA, patch kits, tools, library, maps, communications equipment, weather station, and many other related items.

Examples: Outfitting response vehicles with borrowed or makeshift materials

In **St. Johns County, Florida** the hazardous material team's chlorine kits actually belong to the local water department, and are kept on the team's vehicle rather than at the waterworks. Patches and gaskets are made from scrap rubber, and a set of vicegrips with a welded extension is used to close off leaking hoselines.

In **Guilford County, North Carolina** a lot of the equipment used by the Guilford County Department of Emergency Services is homemade. For example, every vehicle is equipped with homemade dome lid clamps that can be hooked over the dome lid of a tank truck, then screwed down to apply pressure and force the lid tightly against the dome lid gasket to stop leakage. Their hazardous materials response vehicle, a 1962 International, was purchased at surplus for \$1.

For continuing information and hints on how to cheaply equip a hazardous materials response van, see the following magazines: **Fire Chief, Fire Engineering, Fire Command, Western Fire Journal, Journal of Emergency Services, or Journal of Hazardous Materials.**

Pool Resources With Other Communities and Purchase Items in Bulk Quantities

Save money—purchase in bulk. Meet with representatives of other agencies and make a list of the basic items that need to be purchased. These may include such items as breathing apparatus, uniforms, hose, tools, and first-aid kits. Reach an agreement on what the standards or specifications of the equipment should be. This has the advantages of (a) making the equipment interchangeable among all the communities, (b) making loans easier to obtain, and (c) ensuring that a person trained on one community's equipment is familiar with that of the next.

Example: Joint Purchasing Program

Metrofire is a mutual-aid association made up of 25 communities and Massport in the Greater Boston, Massachusetts, area. It was formed by the fire chiefs of the communities with the approval of the local governments. Metrofire began its joint purchasing program with firehose. Based on the success of that program, specifications and common purchase procedures were developed for turnout coats, helmets, rubber boots, gloves, and night hitches. Metrofire has also jointly purchased quantities of foam. These are stored in "foam banks" at centrally located member fire stations. Emergency supplies of foam can be quickly delivered to any emergency in any part of the district by dispatch through the Metrofire Control Center.

Utilize Trained Volunteers and Civilians

Cut costs—use volunteers and civilians to handle certain tasks. Staff an emergency response team, for example, with in-house firefighters. Train engine or ladder personnel in hazardous materials problems, control techniques, and response equipment. This is cost-effective when the cost of a full-time team would be prohibitive. Members of the community-at-large may also be willing to become members of the hazardous materials response team either on a volunteer or salaried basis. Volunteer operations are increasingly attractive as the cost of paid firefighters rises. Volunteer dispatchers can be used to supplement full-time, paid staff. Volunteers can also assist in setting up and administering a mutual aid system. Some firefighter unions, however, are now using their bargaining power to discourage volunteer services. The willingness of persons to assist on a volunteer basis should be taken advantage of, **but only if** they receive the proper training, are able to train regularly as a team, and do not upset current unionized operations. Also, one potential problem with the use of volunteers is that volunteer personnel work when they want to, making scheduling difficult.

Examples: Using volunteers to supplement paid staff

In **Prince George's County, Maryland**, volunteers are used to supplement paid staff in the ambulance corps, Fire Communications Center, and among firefighters. Volunteer dispatchers in

the Fire Communications Center have supplied sufficient personnel to prevent calling in off-duty personnel on overtime during periods of high emergency incidents. Prince George's County also uses volunteer firefighters and emergency medical technicians to supplement paid staff. These volunteers were recruited through advertising time donated by local radio and TV stations.

Metrofire in the Boston, Massachusetts area utilizes a volunteer coordinator to keep records and handle administrative details.

Civilians can also reduce costs by serving as emergency medical technicians, clerks, and/or dispatchers.

Examples: Civilian staffing

In **Prince George's County, Maryland**, civilian dispatchers have been trained to return firefighters to firefighting. Creation of a career ladder for civilian dispatchers has reduced turnover and increased professionalism.

In **Virginia Beach, Virginia**, fire department civilians are used in public fire prevention and safety education. These civilians are on their own career ladder, so they do not displace or block the advancement of any uniformed firefighters. Also, civilian fringe benefits are inferior to those of the uniformed staff. Thus potential friction between civilians and firefighters is reduced.

Seek Industry Assistance or Loans of Needed Equipment or Materials

If the above measures fail to provide you with needed equipment or materials, seek local industry assistance. Industry is often willing to provide loans or donations. Their assistance promotes public safety, enhances their image in the community, and will help to keep tax rates down. As indicated by the following examples, arrangements for **loans** of equipment are quite common.

Examples: Industry loans of equipment and materials

In **Gulfport County, North Carolina**, the County Department of Emergency Services (DES) has direct access to a **trailer loaded with absorbent material**, but owned by Colonial

Pipeline. Although the pipeline company has its own emergency response team, all of its equipment is available to the DES by simply hitching up Colonial's trailer and towing it to where it is needed.

In **Memphis, Tennessee**, the Fire Department's hazardous material squad has the **keys to the warehouse** of a local fire/ safety supply distributor. When materials are needed, squad members can enter the warehouse and take the materials needed. The company is reimbursed later. The team is spared the expense of keeping expensive inventory.

In **Denver, Colorado**, an agreement between the City Office of Emergency Preparedness and the Associated General Contractors of the area makes any type of **heavy equipment** available to the Fire Department. A single telephone call can obtain anything from cranes to dump trucks. The only charge to the city is for the operator's time. The construction industry donates the equipment time as an emergency public service.

Rather than purchase an expensive **chlorine kit**, the **Mount Pleasant, South Carolina** Fire Department has instead arranged with the local waterworks to borrow theirs whenever they need it. Similarly, the **St. John's County, Florida**, hazardous material response team obtained **A and B chlorine kits** for their emergency vehicle from the local Water Department.

You should note especially that the Chlorine Institute has available at minimal cost a list that identifies the location—by type (A, B, or C)—of chlorine emergency kits in all states. Rather than purchasing kits, consider borrowing a kit when needed from a local user. Of course, chlorine incidents demand quick action, so any loan arrangement must provide for ready access to the kit by the hazardous materials response team. For a copy of this list, training packages and instructional booklets, write the Chlorine Institute, 327 Madison Avenue, N.Y., N.Y. 10173.

Local industry may also be willing to **donate** certain equipment items, particularly if the donation is tax-deductible. If there is a question on its tax status, a non-profit, tax deductible charitable corporation can be set up to accept donations of emergency materials or funds. Donations have "stretched" the budgets of many hazardous material teams.

Examples: Industry donations of equipment and materials

In **Gulford County, North Carolina**, the hazardous materials response team's **oil spill containment trailer** was donated by the Greensboro Oil Jobbers Association.

The **North Charleston, South Carolina** Fire Department stocked its **hazardous materials response truck** with a variety of chemicals provided by local industry.

St. Johns County, Florida obtained two **acid suits** on permanent loan from industry. A local rubber dealer gives the county team members scraps to make patches.

Houston, Texas's hazardous materials team has the **training and travel expenses** of team members paid by industry.

Before soliciting donations from industry, make up a list of necessary equipment and materials. Also, working through industry associations may be easier than approaching individual firms. If an industry emergency mutual aid organization exists in your area, seek its support first. Finally, try to make the terms of any loan arrangements formal. Be specific about who will be contacted to borrow the equipment, and try to arrange for 24-hour access.

3

Inspection and Enforcement

Overview

To prevent hazardous materials transportation incidents, the US Department of Transportation (DOT) has developed a comprehensive regulatory program¹ that:

- covers thousands of hazardous materials;
- focuses upon the practices of container manufacturers, shippers and carriers;
- regulates the movements of these materials by truck, rail, air, barge and pipeline.

Most businesses affected by the Federal hazardous materials transportation regulations—or by similar state regulations—comply with them most of the time. However, there are always some businesses that violate safe hazardous materials handling, shipping and transport practices. Some do so out of carelessness. Others violate the rules out of ignorance. The complexity and changing nature of hazardous materials transportation regulations makes it difficult for many to keep informed of all the requirements that affect them. New or exceedingly small firms are often guilty of not knowing what rules or regulations they have to comply with. A broad and continuing **education program** is needed to inform industry of the requirements it must meet. This could correct most carelessness and ignorance. The threat of stiff penalties for noncompliance will reduce the number of “careless” businesses. A few businesses, however, willfully violate applicable regulations. They either (a) fundamentally disagree with them, or (b) cannot comply and stay in business. With the large start-up costs in many industries, young companies often find it particularly difficult to comply with the letter of every regulation. Only a good **inspection program**—backed by a strong **enforcement program**—discourages these types of hazardous materials safety violations.

An effective hazardous materials inspection program can be established on a limited budget by (a) limiting the scope of the program, (b) combining inspections

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¹ For a comprehensive summary of the Federal regulatory program on the transportation of hazardous materials, see “A Guide To The Federal Hazardous Materials Regulatory Program” available from DOT, Office of the Secretary, Technology Sharing Program. The Federal Hazardous Materials Transportation Regulations are contained in **Title 49 CFR**, Transportation, Subtitle B—Other Regulations Relating to Transportation, Chapter 1, Research and Special Programs, US DOT, Parts 100-199.

for hazardous materials with other ongoing inspection programs, (c) coordinating inspection activities with those of adjoining jurisdictions, (d) employing part-time or volunteer inspectors, and/or (e) encouraging the development of industry "self-inspection" programs.

Kinds of Inspections

The enormous size of the hazardous materials industry makes it virtually impossible for the Federal government to carry out all hazardous materials inspection and enforcement activities. Industry education, inspection and enforcement programs are now being implemented by various agencies within the US Department of Transportation including the Materials Transportation Bureau (MTB), the United States Coast Guard (USCG), the Federal Aviation Administration (FAA—Civil Security Division), the Federal Highway Administration (FHWA—Bureau of Motor Carrier Safety (BMCS)), and the Federal Railroad Administration (FRA). The staff available in these agencies cannot begin to inspect all of the over 21,000 suppliers of hazardous materials containers and 1.3 million vehicles regularly used to transport hazardous materials. The Federal government's inspection resources are most efficiently used if they focus upon container manufacturers and shippers, and upon those transportation modes that are predominantly interstate in nature—air, rail, barge, highway and pipeline.

State and local efforts are most efficiently directed towards the inspection of **highway carriers of hazardous materials**. State and local officials know best the traffic patterns and truck routes used in their areas. They can more efficiently mobilize inspection and enforcement forces than can the Federal government. Some states may already have motor carrier safety and/or weight inspection personnel in the field.

The inspection of trucks carrying hazardous materials requires a field staff that is:

- empowered with the authority to conduct inspections (including the authority to stop vehicles);
- trained to identify hazardous materials safety violations;
- equipped to detect all violations (e.g., radioactive material inspections will require special equipment); and,

- trained in reporting and collecting the data necessary to support enforcement actions.

For guidance on how to establish the necessary legal authority for an inspection program, see Section 5 of this Guide. Suggestions on how to train inspectors and educate the regulated industries on a low budget can be found in Section 4.

Performing Hazardous Materials Inspections on a Limited Budget

Inspections and penalties for noncompliance are important. However, a primary objective should always be to obtain the highest level of cooperation possible from those in the industry being regulated. An emphasis should thus be given to education as well as inspection and enforcement. A good education program that reaches all of those potentially affected by the regulations will reduce the need for large inspection staffs. It also fosters improved government-industry relations. Although limited in number and availability, staff from MTB's Hazardous Materials Enforcement Division and FHWA's Bureau of Motor Carrier Safety are willing to assist in designing an education program. Industry associations will often sponsor training or education seminars, and encourage their membership to attend. Use existing education programs to minimize the costs of developing a shipper/handler/carrier education program. Establish a good industry education network; a wise investment here will be more than offset by the savings that result from a smaller inspection force.

Limit the Scope of the Hazardous Materials Inspection Program

It is not necessary to regularly inspect every vehicle carrying hazardous materials on every roadway. Extensive inspection surveys are impractical, unnecessary and an inefficient use of resources. Look for ways to save on inspection costs. Consider the following:

First, keep inspection costs low by concentrating on **bulk** shipments of hazardous materials. Limit inspections to a **single "high risk"** hazardous material, or restrict inspections to a subset of hazardous materials (e.g., hazardous wastes). The Texas Railroad Commission's Liquid Petroleum Gas (LPG) truck inspection

program exists as an example of how an inspection program was kept small and manageable by concentrating on a single commodity—LPG.

Second, keep the size of the inspection staff down by conducting **terminal inspections** and limiting the number of on-the-road inspections performed. Identify the major hazardous materials carriers (and shippers) by consulting:

- accident report files;
- fuel tax reports;
- Federal/state records of operating certificates issued;
- mail surveys;
- telephone book Yellow pages;
- BMCS regional office files; or,
- “personal knowledge”.

Terminal inspections are generally much more effective than on-the-road inspections in reducing the number of unsafe hazardous materials carriers on the highway. More vehicles can be inspected in a shorter period of time—and **before** they get onto the road. Also, don’t inspect every vehicle at each terminal. For example, if the carrier specializes in the bulk transportation of hazardous liquids, inspect a sample of every different kind of DOT-specification tank truck in the carrier’s fleet. Of course, terminal inspections are aimed at the hazardous materials carriers domiciled in your area. Limited on-the-road inspections, therefore, are necessary to monitor the conditions of other carriers.

Third, consider inspecting only a select list of **critical hazardous materials safety items** rather than performing a “full” inspection of every vehicle. A “complete” roadside inspection, for example, would involve checking for:

- proper shipping papers and placards;
- leaking cargo or damage to the tank car;
- loose dome covers or other openings, valves, etc. not securely closed;
- driver qualifications: valid license, valid medical certificate, current daily driver’s log; and,
- mechanical condition of the vehicle: defective brakes, tires and steering.

From the standpoint of safety, it may be more effective to inspect a larger number of vehicles for a smaller number of items (more crucial to safety). A critical item

inspection technique makes on-the-road and terminal inspections more efficient. It also increases carrier respect for the inspection process by minimizing the inconvenience caused by the inspection.

Finally, “stretch” the inspection staff by performing the hazardous materials inspections periodically. Limit the geographic areas—or roadways—that are covered. For example, consider inspecting only those vehicles that travel a given stretch of roadway. Rotate inspection staff to cover different areas throughout the year.

To decide how to target inspection activities, utilize all available data and data sources. The risk profiles of carriers—and of selected routes—developed from a hazards assessment will be useful in planning inspection coverage.

The Bureau of Motor Carrier Safety (BMCS) in the US Department of Transportation can also provide useful information through an automated Management Information System (MIS). It currently contains information on over 68,000 carriers and over 12,450 hazardous materials shippers throughout the US. This MIS can (a) report all of the known carriers domiciled in your region, (b) rank them by the average number of driver/vehicle violations found per inspection, (c) list the number of truck inspections each carrier has undergone, and (d) give the date of the most recent audit each carrier has undergone. While the BMCS MIS data will be limited in its usefulness, the information can help to analyze individual carriers’ performance or the performance of selected classes of carriers (by fleet size or type of operation).

Many state motor vehicle agencies compile safety inspection and accident reports as part of their daily functions. Use their data acquisition and data processing capabilities as well to identify which carriers (and ultimately shippers) should be inspected. In **Washington, Oregon** and **Idaho**, for example, a data system has been developed that makes extensive use of state data on truck accidents and truck traffic violations, plus the BMCS-collected data.

Another important source of information is currently being developed under the requirements and authority of the Resource Conservation and Recovery Act (1976). As encouraged by RCRA, many states are now authorized by EPA to develop and implement a compre-

hensive hazardous **waste** management program with a cradle-to-grave tracking system. Under this system, a transport manifest is completed by the generator of hazardous waste and given to the transporter. Transporters must deliver the hazardous shipments to the facility designated by the generator, keep records, and report any spills enroute. Failure to deliver the shipment to the licensed disposal facility triggers an investigation of the transporter by the state. This manifest data can assist in identifying irresponsible transporters that should be inspected regularly.

Example: Using hazardous waste manifests to identify irresponsible carriers

The **Hennepin County (Minnesota) Bureau of Public Service, Department of Environment and Energy**, has developed a computerized Management Information System (MIS) for storing hazardous waste management plans and tracking hazardous waste shipments. This MIS system processes a variety of data on a statewide basis for the State of Minnesota's Hazardous Waste Program.

The MIS has three primary data bases: (a) **company** data base (name, address, officers, and general activities of each company); (b) **plan** data base (names of the hazardous wastes handled at the company, and information on the materials' hazardous characteristics, production, storage and disposal procedures, and transporters used); and, (c) **shipping paper** data base (information found on the hazardous waste manifest, including the wastes, volume transported and final disposal site). Each year, about 6,000 shipping papers are tracked by this system.

For more information, contact the Hennepin County Department of Environment and Energy, 320 Washington Avenue South, Hopkins, MN 55343.

Integrate the Hazardous Materials Inspection Program With Other Ongoing Inspection Programs

A hazardous materials inspection program will require a well-trained and equipped field staff. It is not always necessary that a separate hazardous materials inspection unit be established. Use the resources associated with existing state and local inspection programs to perform hazardous materials inspections when feasi-

ble. In many states, truck hazardous materials inspections can be conducted in conjunction with, and using the facilities of, State weighing programs. The weigh stations provide a convenient, safe spot for pulling trucks over and inspecting them. Consider combining a hazardous materials inspection program with existing truck weighing or safety inspection programs. Use personnel from the same department. Fire department personnel might also be trained to perform inspections at major truck terminals in the area.

Examples: Consolidation of inspection programs

In **Illinois**, the State Police perform truck inspection and field enforcement with 45 troopers scattered across the state. These officers spend about 80 percent of their time on hazardous materials work; 20 percent on other duties.

In **Utah**, 45 Highway Patrol Officers perform both general safety and hazardous materials checks on trucks travelling in the state. Twenty of the troopers work in two-person, portable scale teams, weighing and inspecting trucks. They are moved around the state on a rotating basis to cover all major bypass routes and secondary state roads. Thirteen troopers work at eight fixed ports of entry, performing truck inspections only. These inspections concentrate on vehicle condition and driver qualifications. However, trucks transporting hazardous materials are checked for proper placarding and the valves of tank trucks are inspected.

In **Maryland**, the state's hazardous materials inspection activities have been integrated with the Maryland Truck Enforcement Division's truck weighing program. The Maryland State Police Hazardous Materials specialist gives a 2-hour hazardous materials course to police academy recruits. Based on this training, Maryland weight inspection teams may then inspect for hazardous materials and truck safety violations when they have stopped a truck for a weight check.

In **Massachusetts**, a special task force of State Natural Resource Officers has been trained to perform general surveillance, intelligence gathering and inspections of possible illegal hazardous waste dumpers.

There are deterrents to consolidation, however. Some state statutes prevent the consolidation of certain program activities. Collective bargaining agreements may also prove to be a stumbling block. Some fear that the use of existing fire or police personnel to conduct

hazardous materials inspections will compromise their ability to perform their primary responsibilities. In Plainfield, New Jersey, for example, there was considerable skepticism voiced when the City decided to utilize on-duty fire personnel to expand the City's public safety patrol. However, the use of fire employees to conduct traffic control and minor investigation activities in this case has not compromised their ability to respond to a fire emergency. For further information, contact the Fire Division, City of Plainfield, Plainfield, New Jersey 07061.

Coordinate Inspection Activities With Those of Neighboring States and Jurisdictions

To "stretch" inspection resources and eliminate the duplication of effort that typically results with the inspection of interstate carriers, coordinate inspection activities with neighboring states.

Example: Commercial Vehicle Safety Alliance

Agencies in Oregon, Washington, Idaho, Colorado, Alaska, California, Utah, Montana, and Alberta (Canada) have formed the **Commercial Vehicle Safety Alliance (CVSA)**. Under the terms of this Alliance, members agree to conform with minimum truck inspection criteria, and to honor the inspection activities of one another. CVSA members inspect vehicles on highways and in terminals for compliance with a minimum number of critical items. Vehicles which pass the inspection are issued a CVSA decal valid for a period of three months. All participating states and provinces use the same decals, which are color coded to denote the period in which they were issued. The system is a simple one: a vehicle inspected in one state that goes to another state or province with a valid decal is not reinspected, unless of course a defect is clearly visible.

Current inspection procedures call for checks of the vehicle's brakes, steering mechanism, tires and wheels, drawbars, fifth wheels and suspension, and driver logs. Consideration is now being given to expand this minimal list to include items necessary to comply with the Federal hazardous materials regulations.

For more information on how CVSA works, contact Mr. Paul Henry, President of the Commercial Vehicle Safety Alliance, Public Utility Commission of Oregon, Motor Carrier Investigation, Labor and Industries Building, Salem, OR 97210.

The coordination of inspection programs eliminates unnecessary duplication of effort, increases significantly the number of inspections that can be performed, and minimizes the costs and delays that inspections impose on the regulated industry.

Employ Part-Time or Volunteer Personnel as Inspectors

Examples: Using volunteers as inspectors

To staff a **safety inspection and weighing demonstration program** in Idaho, the Idaho Division of Law Enforcement hired 17 interns (criminal justice students). They worked 30 hours a week at ports of entry, inspecting trucks under the supervision of an Idaho State Police Sergeant. This was necessary because Idaho's "Proposition 1" restricted the number of state personnel who could be hired.

Volunteers were used in Tennessee to **monitor the speed of trucks carrying hazardous materials** and then report violators to police.

While the use of part-time and volunteer staff represents a logical way to increase inspection staff, some caution is advisable. Because hazardous materials regulations are complex and continually changing, less than fulltime personnel may be pressed to keep their knowledge and skills up-to-date. This potential problem can be minimized, however, if:

- (a) the part-time or volunteer is trained to deal with hazardous materials regulations **only**; and,
- (b) training and responsibilities focus on inspection requirements **only**, and not on administrative and enforcement procedures as well.

Encourage the Development of Industry Self-Inspection Programs

Finally, inspection resources can be stretched by encouraging voluntary industry self-inspection programs. Under the self-audit concept, firms are allowed to "police" themselves with a minimum of government oversight. To participate, firms must have good safety records and demonstrate that they can satisfy government prescribed criteria. By incorporating industry self-audit programs as part of a formal inspection program,

regulatory agencies can utilize their limited inspection resources more efficiently. Regulatory agencies also benefit from the improved relations that result from recognizing the self-inspection programs already on-going in many companies.

Industry also benefits substantially from a self-inspection program. The loss of valuable material increases company insurance costs. A spill also raises the possibility of criminal or civil liability claims and significant litigation costs. A self-inspection program lessens the likelihood of these occurrences. Industry audit programs also result in the compilation of cost and effect data valuable in management planning and in complying with current Securities and Exchange Commission (SEC) regulations. SEC regulations require that publicly-held companies disclose the cost of complying with existing regulations. A sound audit program also improves a company's public image.

However, industry self-inspections are often viewed with skepticism and objection. Consumer and environmental groups may be reluctant to embrace a program that places more compliance responsibility on industry and less on government unless necessary safeguards can be instituted. Carrier operations which do not now have inspection programs will also resist such a program (unless of course it is voluntary). The additional expense of instituting a self-inspection program is bound to meet some resistance, especially if (a) the existing inspection program is taxpayer-supported, and (b) industry is being pressured to provide funding assistance for other public programs as well. There will also be increased government cost for oversight.

Many large companies already inspect their vehicles and monitor their drivers carefully. A formal or voluntary industry self-inspection program gives their efforts the recognition they deserve. Other businesses, however, may not have the motivation or resources to independently establish self-inspection programs. If this is the situation, industry associations are urged to pool their resources and become involved in the administration of such programs.

Example: Industry self-inspection program

Industry and government agencies located in the area of the Houston (Texas) Ship Channel have formed an organization called "**Channel Industries Mutual Aid**". To belong to CIMA, as it is called, every member company must comply with a number of minimum conditions. As one of these conditions, "each member agrees to perform an annual self-inspection and complete a CIMA self-inspection form, and file that form with the CIMA Inspection Officer. Further, each member agrees to cooperate fully with authorized inspections by the CIMA Inspection Officers." For further information on CIMA and its self-inspection program, contact the Chief, Houston Fire Department, 410 Bagby Street, Houston, TX 77002.

Industry self-inspection programs can ease considerably the burden placed upon state and local inspection/enforcement forces. They require little government oversight to administer, while reducing the need for large (and expensive) inspection staffs. Many federal, state and local agencies are now establishing frameworks which allows industry self-inspection programs.

4

Training and Education

Overview

Training and education lies at the heart of every good hazardous materials transportation safety program. An effective **carrier inspection and enforcement** program requires training that:

- explains all existing Federal, state and local hazardous materials transportation regulations;
- teaches appropriate inspection procedures and techniques; and,
- describes the information and procedures needed to take an enforcement action.

Without proper training, hazardous safety conditions can go undetected and uncorrected. Training for **response** to hazardous materials transportation spills is equally important. It is necessary to learn:

- what the duties of emergency response personnel at the scene of a spill are;
- how to quickly and accurately assess the hazards present at the scene;
- what the proper spill control and containment technique(s) are; and,
- how to properly use all available emergency response equipment and materials.

Inadequate or improper training can negate the best intentions and render the most up-to-date response equipment ineffective. An improper response can quickly turn a minor spill into a major catastrophe endangering lives and property.

Many training courses and manuals have been developed by a variety of public and private groups. Yet, proper training is not always reaching those who need it for a number of reasons including:

- the expense of sending staff to appropriate courses may be beyond an agency's budget.
- other job-related responsibilities may prohibit the attendance at training sessions. Part-time and volunteer personnel often cannot afford to take the time to attend training sessions.
- the courses and materials available may not meet specific training needs. For example, some courses may not match a particular individual's actual job responsibilities. Similarly, many courses either do not provide field training drills or may use equipment and procedures which are quite different from those available in your area.

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These obstacles can be overcome by defining training needs very carefully. Save money by attending training courses that are offered in your area. If appropriate training courses are not currently planned, work to bring a commercially-available course to the area. Use self-help manuals and materials and explore the use of commercial films, slide shows, video-teleconferences, self-produced videotapes, cable TV and interactive computer technology to bring needed training materials to you. If necessary, pool resources with other communities and establish regional training centers. Also solicit local industry funding and support. Hazardous materials training programs can be inexpensively developed and delivered to those who need them.

Available Training Programs

Numerous training courses and materials exist to explain the Federal Hazardous Materials regulations, describe uniform inspection and enforcement techniques, and provide guidelines for responding to emergencies. These courses have been developed by DOT, by state and local training institutes, individual firms, industry trade organizations, colleges and universities, private training institutes and consultants. In addition:

- they have been developed for a number of different groups:
 - government inspectors
 - fire departments
 - law enforcement agencies
 - manufacturing companies
 - chemical companies
 - shippers
 - carriers
 - emergency response teams
- they deal with a variety of different chemicals and hazardous materials groups:
 - oil spills
 - pesticides
 - flammable liquids
 - hazardous wastes
 - combustible liquids
 - restricted articles
 - radioactive materials

- they cover a broad range of topics:
 - spill monitoring and sampling
 - labelling
 - marking
 - response personnel protection and safety
 - disposal requirements
 - packaging
 - hazard evaluation
 - mitigation and treatment
 - shipping requirements
 - inspection procedures
- they focus upon movements by all modes (truck, rail, barge, pipeline, air); and
- they offer simulated drills and field exercises, as well as classroom training.

Exhibit 4-1 in Appendix II provides a sampling of the subjects covered at two of the hazardous materials training courses offered by the US Department of Transportation's Transportation Safety Institute (TSI) and the Colorado Training Institute (CTI).

The U.S. Department of Transportation, Information Services Division, is a prime source of information on the training courses and seminars that may be available in your area. DOT regularly compiles a listing of hazardous materials training courses being offered throughout the US by colleges and universities, corporations, business organizations, and Federal, state and local government agencies. For copies of this listing, contact the Training Officer, Information Services Division (DMT-11.10), US Department of Transportation, 400 Seventh Street, SW, Washington, DC 20590. Another recent and comprehensive listing of state and local hazardous materials training programs can be found in the publication, "Fire Defense and Emergency Response Planning: Resource Directory," prepared by the Northwest Arkansas Regional Planning Commission, Springdale, Arkansas, for the US Fire Administration, Federal Emergency Management Agency. State and local fire training organizations also periodically sponsor courses and seminars on how to properly manage hazardous materials incidents. For more information, contact the director of the fire training institute in your state, or the National Fire Academy, Office of Admissions, 16825 Seton Ave., Emmitsburg, Maryland 21727.

Obtaining Hazardous Materials Training on a Limited Budget

Define Training Needs Very Carefully

"Numerous hazardous training programs have been written and implemented. The problem with most of them is that they are not targeted for a particular audience. The only criteria seems to be how many seats can be filled at a high registration fee. . . . Fire fighters, law enforcement personnel, transportation safety personnel and manufacturers are thrown together in a potpourri of grab bag information. Is this an effective use of the individual's, as well as the trainer's time? . . . It is time to recognize that there are three levels to the magnitude of a hazardous materials incident.

By recognizing which individuals in each agency will need training, the courses can be geared to the job requirements."
(emphasis added)

A quote from Chief Warren E. Isman in "The Three-Level Emergency Response System,"
International Fire Chief, April 1980.

To make the most of a limited training budget, take Chief Isman's advice. Don't attempt to become an expert on everything. The hazardous materials training courses currently available differ significantly in their content and quality. To decide which (if any) of them is best, have a clear idea of what should be known and what skills should be acquired.

To define your training needs, develop a series of matrices similar to those shown in Exhibits 4-2 and 4-3 in Appendix II. These matrices were developed by the Puget Sound Council of Governments, and relate a number of different "subjects" and "skills" to a total of forty-eight (48) different positions or occupations. Matrices like these provide the information necessary to target training efforts. The information in these matrices also assist in evaluating the qualifications of individuals seeking one of the positions listed.

Attend Only Those Training Courses That Are Offered Locally

A number of additional, simple steps can also be taken to minimize the drain on a training budget. Attend only those training courses being given in the

immediate area. Investigate thoroughly the training opportunities in your area. Then consider the hazardous materials training opportunities offered by state fire academies and other state agencies. Look to the hazardous materials training programs offered on a nationwide basis if only they can provide the specialized training and facilities desired.

If it is necessary to travel a sizable distance, send only one person. Have that person return to provide the same course material to other members of the agency, team or company. It is a highly efficient practice to "train the trainer" and then establish a training network that builds upon the trained individual's knowledge. If the available budget can't cover travel expenses, split the costs with other communities, industries, or organizations.

Bring the Needed Hazardous Materials Training Programs To Your Area

If the cost of sending people to training courses is still too high, search out ways to inexpensively bring the training to you. There are several ways to accomplish this, depending on the kinds of skills that need to be acquired.

If a good understanding of hazardous materials regulations and emergency response techniques is needed, explore the possibility of **sponsoring a commercially available training course**. Many organizations—public and private—are willing to offer their training services at various field locations across the country. Investigate with the course sponsors the conditions under which they would be willing to conduct a hazardous materials course or seminar in your area. Once again, seek contributions from others if resources are not sufficient to cover instructor expenses, the cost of materials and room rental fees. Other communities or organizations may be more willing to share expenses under this kind of arrangement than if a fellow firefighter—not trained as a teacher—were to be sent to an available course.

Other, inexpensive ways to bring specialized hazardous materials training to your area include the use of:

- video-conferences;
- self-produced videotapes;
- cable television;

- in-house computers; and,
- commercially produced films, slide programs, and video-cassettes.

The above communication technologies exist as useful, but often underutilized, teaching tools. They are particularly beneficial for training **volunteer** inspectors and emergency response personnel because they offer the freedom to schedule the training sessions. They also (a) eliminate transportation costs, (b) standardize training by assuring that the exact same information is presented to every student, and (c) allow for the training of new personnel quickly whenever there is a turnover in staff or change in responsibility.

Example: Using video-teleconferences to train emergency response personnel

The Public Service Satellite Consortium in Denver, Colorado, recently offered a **video-teleconference** on the subject of "Fire and Emergency Management" that was picked up by a number of municipalities across the country. In Massachusetts, for example, the Adams-Russell Company channeled the program via the Town of Waltham's satellite dish to the local Elks Club for viewing by state and local emergency response personnel.

Self-produced videotapes, two-way cable television systems and interactive computer technologies offer other advantages as well. **Videotapes** produced in-house allow the development of hazardous materials training materials involving your own personnel, operational procedures, and equipment.

This eliminates the risk that staff will learn those parts of commercially prepared training programs that are **not** applicable to your department. Videotapes are also quite inexpensive to produce. A portable video-tape recorder (VTR), portable camera, TV monitor, cables and cassette tapes are all that is needed to get started. Other audio-visual items can be purchased later. They can also be borrowed on an "as needed" basis from other agencies or departments. **Interactive computer systems** and videotapes used in a two-way **cable TV system** allow viewers to actively "participate" in a training session. The skills of decision-making and command are learned best by participating in real-life emergency simulations.

However, it is impossible to plan for real emergencies. It is also difficult to arrange for a series of mock spills to develop and refine these particular skills. Computer simulations exist as realistic, low cost alternatives to real-life simulations. A hazardous materials incident simulated on a micro-computer offers the opportunity to develop many important skills under a wide range of emergency situations. Moreover, computer-simulated incidents can be replicated fairly inexpensively without leaving your desk. The use of micro-computers also does not require any previous computer experience.

Example: Using cable TV to cut training costs

The City of San Antonio, Texas, uses **cable television** to provide inexpensive in-service fire training to its over 1,000 firefighters located in 40 fire stations. Providing in-service training for these people typically required 20 teaching days a year. Significant gasoline/vehicle maintenance expenses were also incurred in transporting the personnel to the training academy. There was also the expense of taking companies out of service. One training session for all stations was estimated to cost \$1800 in transport costs and 362 hours in out-of-service time. By utilizing the local cable television franchise, the City has been able to train fire department personnel without the attendant cost and scheduling conflicts previously encountered. It is estimated that after only one year of operation, the savings in time and money realized have already offset the original equipment cost of \$7000. Plans are now underway to expand the use of the local cable TV franchise to educate the public as well. For more information, contact the Assistant Fire Chief, San Antonio Fire Academy, 4531 South Zarzamora Street, San Antonio, Texas 78211.

The National Fire Protection Association (NFPA) can provide numerous **films and audiovisuals** featuring effective ways for firefighters to handle hazardous materials incidents. Topics covered include:

- how to handle LNG truck emergencies;
- how to properly use foam;
- how to handle pipeline accidents; and,
- how to handle pesticide fires and spills effectively.

For a copy of a current catalogue, contact the NFPA, Batterymarch Park, Quincy, MA 02269, Attention of Publications Sales Division.

Of course, computer simulations, commercial films and videotapes cannot teach the fundamentals of teamwork. They also cannot provide the hands-on experience necessary to properly use the available equipment. Only facilities capable of simulating real-life emergency situations can provide this kind of training. Many state fire academies or training institutes have, or are developing, facilities where real-life drills for first responders can be conducted. These same state training programs are also providing their students with the tools necessary for intercommunity teamwork. In Massachusetts, for example, the State Fire Academy's training programs traditionally instructed firefighters on how to work with their own departments. There was little reason to teach intercommunity teamwork. Even when one community's apparatus went to the aid of another, firefighters tended to stay with their own departments. With recent manpower and equipment cutbacks, however, recruits are now being taught how to work with the firefighters and equipment from other communities. Conducting simulated drills and training medical personnel properly are also extremely important. The treatment of people exposed to certain toxic fumes and radiation requires skills and procedures not routinely used. The Joint Commission on Accreditation of Hospitals requires every hospital to perform two disaster drills every year in order to be accredited. If staged around mock hazardous materials incidents, these drills offer the opportunity to train medical personnel.

If there are no facilities capable of providing simulation-type training in your area, pool your resources with others and establish a **regional training center**. A regional training center that teaches the above skills and provides basic instruction may be a highly cost-effective solution to your hazardous materials training programs.

Example: Colorado Training Institute

The **Colorado Training Institute** (CTI) in Denver, Colorado, exists as the first "regional training center" established in the US to provide hazardous materials education. Government employees, firemen, law enforcement officers, civil defense personnel, chemical companies, shippers and carriers have all benefitted from the variety of seminars offered regularly by the school. Established in 1973, CTI is a model of how public

agencies and private industries can form a partnership to provide high quality training and education. As evidence of this partnership, the school was funded by the U.S. DOT through the Colorado Division of Highway Safety. The administration of the school's program, however, is carried out by full-time employees of the Denver Police Department, the Colorado State Police, and the Division of Highway Safety. Representatives of many industries and Federal agencies volunteer their time to provide the actual instruction. For more information on CTI's activities and how it was started, contact the Director, Colorado Training Institute, 1001 East 62nd Avenue, Denver, CO 80216.

Economize further by relying heavily on **self-help materials**. There are a variety of self-help guides available from DOT, other Federal agencies, and industry on a variety of topics. A sampling of available reference books and manuals is presented in Appendix I. For more information on emergency response manuals, contact the Training Officer, Information Services Division, Materials Transportation Bureau, 400 Seventh Street SW, Washington, DC 20590. MTB's Hazardous Materials Enforcement Division in the Office of Operations and Enforcement is also available to assist you in obtaining training materials for inspectors. It may also be beneficial to subscribe to several of the following periodicals that routinely provide information on hazardous materials training, inspection services, and proper response techniques: **Fire Journal**, **Fire Command**, **Fire and Materials**, **Fire Technology**, **The International Fire Chief**, **Fire Chief Magazine**, or **Fire Engineering**.

Lastly, search out **guest speakers** from area universities and industry willing to lecture or give free classes. Local members of area industry (chemical, trucking, etc.) are usually quite willing to donate their time and expertise to familiarize their neighbors with the hazardous materials they use, manufacture and transport.

Seek Local Industry Funding and Support

Local industry can also help to develop a hazardous materials training program. Many companies now provide their employees with comprehensive hazard-

ous materials training as part of broader safety training programs. Find out the kinds of formal hazardous materials training programs available at industrial facilities in your area. Ask that your staff be allowed to attend. Industries that sponsor such training programs generally welcome the opportunity:

- to educate firefighters and other first responders on the types of chemicals they use and the hazards they pose;
- to familiarize local firefighters with their operations; and,
- to familiarize local emergency response personnel with specialized emergency equipment they have.

Example: Industry training assistance

Since 1975, the **Southern Pacific (SP) Transportation Company** has been providing a variety of training services to fire department personnel located along the 18,000 miles of rail track that it operates. To familiarize employees and fire service people with leaking tank cars, SP produced a unique audiovisual training program titled, "Keeping Hazardous Materials Contained in Tank Cars." Another audiovisual program titled, "Emergency Fire Fighting Procedures on Railroad Equipment," was produced to describe how fires in locomotives and freight cars should be extinguished. To provide the important, hands-on experience of actually repairing a tank car leak, SP constructed four complete replicas of tank car domes and mounted them on 15-foot trailers. These "dome mobiles" have since been used to familiarize firefighters with the array of fittings and valves found on different car types. Firefighters also learn how to use special tools and repair the gaskets and devices that cause most leaks. Well over 20,000 firefighters in over 50 fire departments have been trained with the mobile domes since 1975.

Also encourage local industries to pool their resources and provide needed hazardous materials training. Several local industry associations have arisen across the country for the primary purpose of providing hazardous materials training, particularly for emergency responders.

Example: South County Industrial Emergency Council

The **South County Industrial Emergency Council (SCIEC)** in California is a non-profit educational organization dedicated to promoting cooperation between industry and emergency services. SCIEC is funded by membership fees, seminar fees, and donations. It provides its over 160 member organizations with a variety of workshops, seminars, training sessions, and staged disaster drills designed to improve safety practices and emergency response capabilities. A quarterly newsletter is also prepared to share information among members on (a) good storage and transport practices, (b) preplanning activities, and (c) staff training programs that may be available through member organizations. Future plans call for the development of a centrally located Hazardous Materials Resource Center, to include a library and a 24-hour data bank on hazardous materials and emergency handling procedures. Future plans also call for the development of a hazardous materials emergency response training program for local government agencies and industry. For more information on SCIEC activities, contact James O'Donnell, Battalion Chief, South County Fire Department, 666 Elm Street, San Carlos, CA 94070.

Small companies, unable to support facility training programs themselves, will find it especially beneficial to pool their resources.

5

Legal Authority

Overview

Effective state and local hazardous materials safety programs depend on properly trained personnel, adequate equipment and materials. Inspection and emergency response activities also require proper **legal authority**. Departments of Transportation in several states, for example, have broad authority to inspect trucks, but no power to stop the trucks for inspection or take enforcement action. Similarly, some states are not legally prepared to deal with emergency response situations. In many states, individuals and organizations are urged to assist at the scene of spills, but not protected against liability claims. New or modified legislation and regulations are often necessary before vehicle inspections and emergency response activities can begin.

Issues To Address In Developing A Comprehensive Legislative and Regulatory Package

In developing legislation and supporting regulations for hazardous materials **carrier inspection programs**, the following questions should be asked and answered:

- What state agency or agencies should be authorized to develop regulations and administer the inspection program? Which agencies currently have broad inspection and enforcement programs? Should a new state agency or authority be created and empowered to regulate hazardous materials transportation activities?
- What should the relationship be with Federal statutes and regulations?
- Should the administering agency(s) be granted the authority to set fees, accept funds, appropriate and spend money?
- Should all hazardous materials be subject to regulation or only a select few of the "highest risk" materials?
- Should all transport modes be regulated? Shipments of all sizes?
- Should the hazardous materials transporter be periodically required to obtain a permit or license? What should the applicable standards for licensing be and under what conditions should the license be revoked or modified?

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- What items should be regulated and included among those inspected: shipping papers, placards, driver qualifications, vehicle mechanical condition? How strict should the requirements and inspection standards be?
- Should any exemptions or special requirements be allowed?
- Should only "certified" personnel who have completed a standard training course be allowed to conduct the inspections? What standard training program should be required?
- Should "certified" inspectors be allowed to stop vehicles as well as inspect them? Will on-the-road inspections be permitted as well as terminal fleet inspections?
- Should there be specific inspection procedures and reporting requirements?
- Should the chief compliance officer (CCO) of the company be held personally liable for regulation violations?
- Should the authority be given to levy penalties, fines and other sanctions, such as "out-of-service" orders? How severe should they be?
- What form of administrative or judicial hearing should be available to a transporter found in violation of a regulation and fined or penalized?

A comprehensive legislative package that responds to the concerns of state and local agencies, area industry and the general public is also necessary to support **emergency response** activities. Legislation that deals with emergency response issues should also address a number of important issues:

- What level(s) of government, agency(s) or individual(s) should be authorized to react to and coordinate hazardous materials emergency response? Should it be limited to a single state agency, multiple state agencies, county agency(s), or to the municipality in which the incident occurs?
- Should a new state or local agency be created for the specific purpose of coordinating the response?

Examples: State laws dealing with emergency response

In **Virginia**, a State Office of Emergency Services was established by the Commonwealth of Virginia Emergency Services and Disaster Law of 1973. Its purpose is to ensure that the State and its political subdivisions are adequately prepared to "deal with emergencies and to provide for the common de-

fense and protection of the public peace, health and safety, as well as preserve the lives and property and economic wellbeing of the people that it serves." To support its Hazardous Materials Emergency Response Program (HMERP), a State Emergency Operations Center (EOC) has been established and is manned on a 24 hour basis to advise and provide assistance to local governments in hazardous materials emergencies. The HMERP also provides a hazardous materials emergency response unit, and conducts extensive hands-on training courses for first-responders and emergency management personnel throughout the state. In accordance with State law, the HMERP also monitors the movements of hazardous radioactive shipments in the State.

In the State of **Washington**, the "governing body of each applicable political subdivision" of the State is required to designate a "hazardous materials incident command agency."

Once the lead emergency response agency or individual has been identified, it is necessary to decide whether they should have the authority to:

- appropriate and expend funds for operations, including the authority to issue bonds, obtain loans, and apply for and accept grants in aid?
- acquire equipment?
- appoint or hire personnel?
- enter into contracts?
- incur debts and other obligations?
- enter into mutual aid agreements with other municipalities and counties, or arms of the State or Federal governments?
- commandeer real and personal property in an actual emergency for the purposes of shelter or emergency access?
- take by eminent domain?
- compensate those who gratuitously provide services, equipment, or property?
- provide for the care and housing of victims?
- promulgate rules and regulations to carry out functions?

One of the most important issues to address in a legislative package is that of **liability**. Many government agencies and public employees acting in their official capacity are immune from liability. In most cases, this liability is limited by statute. Evaluate carefully the legal

limits of your liability to ensure that it satisfies your needs. The issue of industry liability should also be addressed. In some areas, private companies and individuals are reluctant to offer their services during a hazardous materials emergency even though their help might save lives and prevent serious damage to the environment. This reluctance to become involved stems largely from their fear of the litigation (and resulting damage awards) that might result from their actions. Private industry often becomes a target for lawsuits when there is a limit on government agency liability.

To overcome this fear, consider enacting what is commonly referred to as **good samaritan** legislation. In its simplest form, good samaritan legislation provides employees of both public agencies and private industry, "with **immunity from civil liability** for acts or omissions that result in injury to persons or property in the **good faith** rendering of **emergency care, assistance or advice** unless such acts or omissions constitute **gross negligence or willful or wanton misconduct**." (emphasis added)

Comprehensive good samaritan legislation will identify who is protected and may limit the extent of the protection. It will also deal with the following important issues:

- What hazardous material or materials should be covered by the legislation? Should liability protection be given for responses to emergencies involving all kinds of hazardous materials, or select materials only?
- What types of emergency situations should be covered by the legislation? Should protection be given those that respond to emergencies that arise from the **handling** of a hazardous material on-site as well as those that occur during its **transportation**?

EXAMPLE:

PENNSYLVANIA's law covers only transportation emergencies. Coverage in **ARKANSAS, ILLINOIS, and NORTH DAKOTA** extends to any emergency involving the discharge of hazardous material.

- Should all private parties be given protection against liability claims? Or should legal protection be given only to those entities whose services are requested by an authorized agency or official, or who have entered into formal, written agreements? Of course, the protection of good samaritan legislation should not extend to those responsible for causing the hazardous materials incident.

Example:

The State of **Washington** requires that either a formal, written agreement be executed well before the rendering of services, or that a notification form be signed by the assisting party at the scene.

- What protection against liability (if any) should be given to entities that act without regard or contrary to the directions of the designated on-scene coordinator (if any)? Should the unauthorized withdrawal of services be sufficient reason to render invalid any and all protection afforded by the statute?
- Should the protection from liability apply to all of the activities associated with the emergency situation?
- Should the protection of good samaritan legislation be limited only to those who possess the technical knowledge, skill or training appropriate for dealing with the emergency at hand? How would such knowledge, skill, or training be determined?

EXAMPLE:

In **INDIANA**, the covered party must have "special training, qualifications or experience in: (A) storing, transporting, or handling a hazardous substance or compressed gas; (B) fighting fires; or (C) emergency rescue and first aid care; or . . . is otherwise qualified to provide assistance appropriate to remedy or contribute to the remedy of the emergency." What this means precisely may have to be determined in a court of law. **ARKANSAS, COLORADO, TEXAS** and **OKLAHOMA** place no restrictions on the qualification of the Good Samaritan responder.

- Should the good samaritan be able to seek and obtain compensation for out-of-pocket expenses?
- What relationship should the good samaritan legislation have with other laws?

Example:

Arkansas Statutes, Sec. 11-1949—provides that the law shall not affect the right of any person to receive benefits to which he or she would otherwise be entitled, including Worker's Compensation, pension law, and Social Security.

For additional information and a "model" of Good Samaritan legislation, contact the Hazardous Material Advisory Council (HMAC) 1012 14th St. N.W., Washington, DC 20005, (202) 783-7460.

Developing A Comprehensive Legislative and Regulatory Program

Developing legislation and regulations to support hazardous materials transportation safety programs is not an easy task. It requires a **thorough understanding of the legal authority already invested in state and local authorities** by existing legislation. The authority to regulate hazardous materials transportation is often limited and fragmented among many agencies. The State of Kentucky, for example, has nine state agencies with various hazardous materials transportation responsibilities:

- Kentucky Department of Transportation: highway and air transport
- State Fire Marshal's Office: responsibilities in all five modes
- Kentucky Railroad Commission: rail transport
- Department of Military Affairs: disaster emergency services
- Division of Explosives and Blasting: transport of explosives
- Division of Hazardous Materials and Waste Management: general responsibilities
- Division of Radioactive Control: radioactive materials
- Department of Natural Resources and Environment Protection: cleanup
- Department of Natural Resources: transport of radioactive materials

Develop and enact new legislation only when necessary to complement or expand existing legislation and authority.

To minimize your effort, consider **adopting Federal statutes and regulations by reference** rather than developing your own independently. [Note that some states cannot legally adopt by reference. Instead, they must write their own regulations and bring them through state rulemaking procedures.] Many states have already adopted by reference the Federal Hazardous Materials Regulations, particularly those that relate to hazardous materials carriage by public highway. Others have adopted by reference the Federal Motor Carrier Regulations, 49 CFR, Parts 390-397, or the Federal Hazardous Waste Regulations. Both of these sets of Federal regulations have now themselves been referenced in the DOT Hazardous Materials Regulations. Familiarize yourself with the substantive requirements of each set of these rules before deciding what to adopt by reference or what to modify. As a guide to the Federal regulatory program on the transportation of hazardous materials, see the publication, "Hazardous Materials: A Guide for State and Local Officials," prepared by the Materials Transportation Bureau. The publication, "EPA/DOT: Hazardous Waste Transportation Interface," available from EPA's Office of Solid Waste & Emergency Response, is also a useful guidance manual. (See Appendix I for further information.)

Adoption by reference can save time in drafting legislation and regulations. It promotes "consistency" among Federal, state and local hazardous materials rules. It also saves the transport industry valuable time and money in having to track and comply with many different state and local rules. If new legislation and regulations must be drafted, note carefully the opportunities that exist for minimizing the amount of legislation and paperwork necessary. In Texas, for example, liability resulting from injuries or damage caused by a company's employee or equipment while under Civil Defense dispatch is eliminated under the Texas State Civil Defense Act. A piece of equipment or person is considered under Civil Defense dispatch when the Civil Defense authority at a given plant sends it on an emergency assignment requested by another Civil Defense authority. By designating a Civil Defense authority at a plant, and requiring that only he be involved,

in requests for mutual aid assistance, Texas authorities have eliminated the need for additional good samaritan legislation.

The form of enabling legislation developed to support a hazardous materials safety program will depend upon factors unique to the legislative process and program priorities of a particular state or municipality. No "model" legislation, therefore, can be reasonably developed. A number of states, however, have developed enabling legislation as part of DOT's State Hazardous Materials Enforcement Demonstration (SHMED) Program. Their experiences with the legislative process may be helpful in developing new state

and local regulatory programs. For further information on the SHMED Program, contact DOT's Hazardous Materials Enforcement Division, Office of Operations and Enforcement, Washington, DC 20590. The National Conference of State Legislatures can also help in developing a comprehensive legislative program. A recent NCSL publication, "Hazardous Waste Management: A Survey of State Legislation 1982," summarizes the legislative activity of each state. (See Appendix I) A number of municipalities have also developed ordinances that expand the inspection powers of the fire service to include hazardous materials. An example of an ordinance developed in Seattle, Washington appears as Exhibit 5-1 in Appendix II.

Appendix I

Select Hazardous Materials Publications

Publication	Content
American Trucking Association, Inc. Handling Hazardous Materials and Transporting Hazardous Wastes. Available from the ATA, Safety and Security Department, 1616 P Street NW, Washington, DC 20036.	4
Association of American Railroads, Bureau of Explosives. Emergency Handling of Hazardous Materials in Surface Transportation. Washington, DC: 1981. Available from the AAR, 1920 L Street NW, Washington, DC 20036	2, 3
Cahners Publishing Company. Hazardous Materials Transportation: A Compliance and Operations Guide. Available from the Hazardous Materials Transportation Newsletter, Cahners Publishing Co., 221 Columbus Ave., Boston, MA 02116	4
Cahners Publishing Company. 1982 Reference Source Handbook on the Transport of Hazardous Materials/Substances/Wastes. Available from Cahners Publishing Co., P.O. Box 716, Back Bay Annex, Boston, MA 02117	2
Chlorine Institute, Inc. Chlorine Manual. Available from the Chlorine Institute, Inc., 342 Madison Ave., N.Y., N.Y. 10017	4
Dennis, A.W., J.T. Foley, W.F. Hartman and D.W. Larsen. Severities of Transportation Accidents Involving Large Packages. Sandia Laboratories, Albuquerque, N.M.: May 1978. Available at local library.	1
Erven, Lawrence W. Firefighting Apparatus and Procedures. 3rd Edition. Available from Glencoe Publishing, Encino, CA: 1979.	3
Federal Emergency Management Agency (FEMA). Guidance for Developing State and Local Radiological Emergency Response Plans and Preparedness for Transportation Accidents. Available from FEMA, P.O. Box 8181, Washington, D.C. 20024.	4
Federal Emergency Management Agency (FEMA). Disaster Planning Guidelines for Fire Chiefs. Prepared by International Association of Fire Chiefs, Inc: February 1981. Available from FEMA, 500 C Street SW, Washington, DC 20590.	1
Federal Emergency Management Agency (FEMA). Hazardous Materials Management System: A Guide for Local Emergency Managers. Prepared by the Multnomah County Office of Emergency Management: July 1981. Available from FEMA, 500 C Street SW, Washington, D.C. 20590	1
Federal Emergency Management Agency/US Environmental Protection Agency. Planning Guide and Checklist for Hazardous Materials Contingency Plans. Prepared by Rockwell International Corp: July 1981. Available from FEMA, 500 C Street SW, Washington, D.C. 20590	1
Federal Emergency Management Agency/US Environmental Protection Agency. A Training Course on Contingency Planning for The Control of Hazardous Materials Spills. Prepared by Rockwell International Corp. (Draft).	1
General American Transportation Corp. How to Handle LP-Gas Emergencies. Available from the General American Transportation Corp., P.O. Box 532, Sharon, PA 16146.	4

Content Key: 1 = publications on how to perform a hazards assessment/ risk analysis
 2 = general reference documents on hazardous materials
 3 = references on methods to combat hazardous materials incidents
 4 = self-help manuals

Publication	Content
Information Transfer, Inc. Control of Hazardous Materials Spills. 1976, 1977, 1978, 1979 and 1980 Conference Proceedings. Available at local library.	3
J.J. Keller & Associates. Hazardous Materials Guide. Available from J.J. Keller & Associates, 145 Wisconsin Avenue, Neenah, WI 54956.	4
National Agricultural Chemicals Association. Pre-Planning and Guidelines for Handling Agricultural Chemical Fires. Available from NACA.	4
National Conference of State Legislatures. Hazardous Waste Management: A Survey of State Legislation 1982. Available from NCSL, 1125 17th Street, Suite 1500, Denver, CO 80202.	2
National Fire Protection Association. Fire Officers' Guide to Dangerous Chemicals. Available from the NFPA, Batterymarch Park, Quincy, MA 02269.	2, 4
National Fire Protection Association. Fire Officers' Guide to Breathing Apparatus for the Fire Service. 2nd Edition (1975). Available from the NFPA, Batterymarch Park, Quincy, MA 02269.	3
National Fire Protection Association. Fire Officers' Guide to Emergency Action. Available from the NFPA, Batterymarch Park, Quincy, MA 02269.	4
National Fire Protection Association. Fire Protection Handbook. 15th Edition (1981). Available from the NFPA, Batterymarch Park, Quincy, MA 02269.	3, 4
National Fire Protection Association. Fire Protection Guide on Hazardous Materials. 7th Edition (1981). Available from the NFPA, Batterymarch Park, Quincy, MA 02269.	2, 3, 4
National Fire Protection Association. Fire Service Resource Directory for Microcomputers. Available from the NFPA, Batterymarch Park, Quincy, MA 02269.	4
National Fire Protection Association. Handling Pipeline Transportation Emergencies. Available from the NFPA, Batterymarch Park, Quincy, MA 02269.	4
National Technical Services (NTIS). Hazardous Materials Incident Response Operations. Available from NTIS, Springfield, MA 22161.	3
Robinson, J.S. Hazardous Chemical Spill Clean-up. Available from Noyes Data Corporation, Park Ridge, N.J.: 1979.	3
US Coast Guard. Chemical Hazards Response Information System [CHRIS]. Published in 4 volumes: Manual 1, A Condensed Guide to Chemical Hazards; Manual 2, Hazardous Chemical Data; Manual 3, Hazard Assessment Handbook; Manual 4, Response Methods Handbook. Available from Supt. of Documents, Government Printing Office, Washington, DC 20402.	2
US Department of Transportation, Federal Highway Administration. Development of Criteria to Designate Routes for Transporting Hazardous Materials. Prepared by Peat, Marwick, Mitchell and Co., September 1980. Available from NTIS, Springfield, VA 22161 [NTIS #PB81-164725].	1

Content Key: 1 = publications on how to perform a hazards assessment/risk analysis
 2 = general reference documents on hazardous materials
 3 = references on methods to combat hazardous materials incidents
 4 = self-help manuals

Publication	Content
US Department of Transportation, Office of the Secretary. A Guide to the Federal Hazardous Materials Regulatory Program. Prepared by the Materials Transportation Bureau (January 1983). Available from Supt. of Documents, US GPO. Washington, DC 20402.	2
US Department of Transportation, Office of University Research. A Community Model for Handling Hazardous Materials Transportation Emergencies. Prepared by Department of Civil Engineering, Kansas State University, June 1981. Available from DOT, Information Services Division (DMT-11), 400 Seventh Street SW, Washington, DC 20590.	1
US Department of Transportation, Office of University Research. Risk Assessment Users Manual for Small Communities and Rural Areas. Prepared by Department of Civil Engineering, Kansas State University, August 1980. Available from DOT, Information Services Division (DMT-11), 400 Seventh Street SW, Washington, D.C. 20590.	1
US Department of Transportation, Research and Special Programs Administration. 1980 Emergency Response Guidebook. Available from DOT, Information Services Division (DMT-11) or from the Safety and Security Department, American Trucking Association, Inc., 1616 P Street NW, Washington, D.C. 20036.	3, 4
US Department of Transportation, Research and Special Programs Administration. Hazardous Materials Transportation Risks in the Puget Sound Region. Prepared by Batelle Northwest Laboratories, May 1981. Available from DOT, Information Services Division (DMT-11), 400 Seventh Street SW, Washington, D.C. 20590.	1
US Department of Transportation, Research and Special Programs Administration. Guide for Brokers, Forwarding Agents, Freight Forwarders and Warehousemen; Guide for Carriers; Guide for Hazardous Materials Shipping Papers; Guide for Manufacturers and Vendors of Hazardous Materials; Hazardous Materials Definitions; Radioactive Materials Definitions. Booklets available from DOT, Information Services Division (DMT-11), 400 Seventh Street SW, Washington, D.C. 20590.	4
US Department of Transportation, Research and Special Programs Administration. State Hazardous Materials Enforcement Development Program (SHMED). Operating Plan (April 1981). Available from DOT, Information Services Division (DMT-11), 400 Seventh Street SW, Washington, DC 20590.	2
US Department of Transportation, Research and Special Programs Administration. Response to Radioactive Materials Transport Accidents. DOT/RSPA/MTB-79/8. Available from DOT, Information Services Division (DMT-11), 400 Seventh Street, S.W., Washington, DC 20590.	3
US Environmental Protection Agency. Manual for the Control of Hazardous Material Spills: Volume I-Spill Assessment and Water Treatment Techniques. (November 1977) Available from NTIS, Springfield, VA 22161 [NTIS #EPA-600/2-77-227]	3, 4

Content Key: 1 = publications on how to perform a hazards assessment/risk analysis
 2 = general reference documents on hazardous materials
 3 = references on methods to combat hazardous materials incidents
 4 = self-help manuals

Publication	Content
US Environmental Protection Agency. Manual of Practice for Protection and Cleanup of Shorelines; Volume I-Decision Guide. (August 1979). Available from NTIS, Springfield, VA 22161. [NTIS #EPA-600/7-79-187a].	3, 4
US Environmental Protection Agency, Office of Solid Waste and Emergency Response. Hazardous Waste Transportation Interface. Available from EPA, Office of Solid Waste and Emergency Response, 401 M Street SW, Washington, D.C. 20460.	4
US Government Printing Office. Chemical Data Guide for Bulk Shipments by Water. Available from Superintendent of Documents, US GPO, Washington, D.C. 20402.	4

Content Key: 1 = publications on how to perform a hazards assessment/risk analysis
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Exhibit 1-1 Hazardous Materials Accident Data

RESEARCH AND SPECIAL PROGRAMS ADMINISTRATION												
INCIDENTS FOR MAJOR HAZARDOUS MATERIALS (1975 - 1980)												
CARRIER	MODE	INCIDENT LOCATION	CITY & STATE	CONT-1	CONT-2	INJURY DEAD	FAILURES	AMT RELEASD	R	FAILD	EX/REG SHIPD	REPORT #
SHIPPER												
HEMLOCK TRANSPORT INC.	H-H	ANDOVER	MA	HYDROGEN PEROX 8-40	BOX FIB	1 GAL	11 00	15 GAL 5	1	80/08/25		1 80/08/25
BERG CHEMICAL INC.		BRUNX	NY	05851 OXALIC ACID	BOX FIB	0 0	\$200		0	80/09/184A		0 80/09/184A
ROADWAY EXPRESS INC.	H-H	ANDOVER	MA	FORMALIN HYDR 41100L		0 0	00 00	5 LBS	0	78/06/26		0 78/06/26
MALLINCKRODT CHEMICAL WORKS		CARLESTADT	MO	05132 UNP-A		1 0	\$100		0	80/07/02		0 80/07/02
BOMMAN TRANSPORTATION CO INC	H-H	AVON	MA	CUMPH CLEANING LIQ C 3/A		5 GAL	20 00	10 GAL 5	2	80/07/11		2 80/07/11
RADIATOR SPECIALTY CO		INDIAN TRAIL	NC	03470 COR		0 0	\$410		2	80/07/205A		2 80/07/205A
ROADWAY EXPRESS INC	H-H	AVON	MA	CUMPH CLEANING LIQ C 3/A		1 GAL	03 21	10 LBS 5	9	80/09/04		9 80/09/04
JANLYN MFG CORP		NORCROSS	GA	03470 COR	BOX FIB	0 0	\$1,000		34	80/10/756A		34 80/10/756A
BOSTON & MAINE CORP	R	AYER	MA	PHOSPHORUS TRIO 2	TANK CAR	14000 GAL	10 00	0 5	1	75/07/19		1 75/07/19
MUNSAUTO CO		EVERETT	MA	08440 COR		3 0	\$0		1	5080052A		1 5080052A
CONSOLIDATED FREIGHTWAYS	H-H	BALLERICA	MA	PAINT ENAM LAG STAN	PAIL MTL	55 GAL	14 00	3 GAL 5	1	77/07/14		1 77/07/14
KOPERS CO INC		LOS ANGELES	CA	08060 F. L.		0 0	\$1,600		4	7090970A		4 7090970A
SUBURBAN PROPANE GAS CORP	H-P	EARNSTABLE	MA	LIQ PETROLEUM GAS	4B	250 LBS	01 00	5 GAL 5	1	79/01/23		1 79/01/23
SUBURBAN PROPANE GAS CORP		SAGAMORE	MA	06300 F. L.		1 0	\$20		1	9030268A		1 9030268A
DORHN TRANSFER CO	H-H	BILLERICA	MA	PAINT ENAM LAG STAN		0 0	00 00	2 GAL 5	1	78/11/10		1 78/11/10
SERVICE COATINGS INC		HARVEY	IL	08060 F. L.		0 0	\$825		6	8111420X		6 8111420X
UNITED PARCEL SERVICE INC	H-H	BILLERICA	MA	METHYL ACRYLATE INH DOTL		1 PIS	10 00	2 OZS 5	1	80/04/04		1 80/04/04
GENERAL LATEX & CHEMICAL CORP		N BILLERICA	MA	06270 F. L.	BOX FIB	1 0	\$250		1	80041253A		1 80041253A
ARKANSAS-BEST FREIGHT SYSTEM	H-H	BILLERICA	MA	PAINT ENAM LAG STAN	17E	55 GAL	02 00	40 GAL 5	1	80/04/16		1 80/04/16
SHEPWIN-WILLIAMS CO		CHILMARK	IL	08060 F. L.		0 0	\$600		10	80050059A		10 80050059A
DELTA AIR LINES INC	AIR	BOSTON	MA	BATTIS STORAGE MET	BOX FIB	0 0	10 00	0 5	1	75/05/21		1 75/05/21
FMC CORP		JUNESBURG	AK	02030 COR		0 0	\$796		1	5060625A		1 5060625A
AIR LINGUS TERRORANTIA	AIR	BOSTON	MA	RESIN SOLUTION	CAN MTL	1 GAL	12 00	0 5	2	75/07/18		2 75/07/18
LASTALL INC		E WELMOUTH	MA	07030 F. L.	BOX FIB	1 0	\$0		3	5070945A		3 5070945A
STONAL DELIVERY SERVICE INC	H-H	BOSTON	MA	BATTIS STORAGE MET	BOX FIB	38 LBS	17 00	0 5	1	75/08/13		1 75/08/13
SEARS ROEBUCK & CO		FARMINGTON	ME	02030 COR		0 0	\$202		1	5090344A		1 5090344A
MC LEAN TRUCKING COMPANY	H-H	BOSTON	MA	WATER TREAT CUMPH	17E	30 GAL	13 27	10 GAL 5	1	77/06/15		1 77/06/15
DEARBURN CHEMICAL DIV CHEMED		LAKE ZURICH	IL	10730 COR		0 0	\$200		7	7071045A		7 7071045A
ROADWAY EXPRESS INC	H-H	BOSTON	MA	PAINT ENAM LAG CL		0 0	00 00	25 GAL	0	79/05/22		0 79/05/22
KELLEY TECHNICAL COATINGS INC		LOUISVILLE	KY	08059 CUMPH L		0 0	\$200		0	9061627V		0 9061627V
ALLEGHENY AIRLINES INC	AIR	BOSTON	MA	BICHLOROMETHANE	BLANK	0 0	14 00	1 GTS 5	1	79/06/12		1 79/06/12
PASSENGER - WOODY B		STOUGHTON	MA	04124 UNP-A	BOX FIB	1 0	\$0		1	9070001A		1 9070001A

Records are sorted by Incident City and Date

* (under Mode abbreviation) = Vehicular accident or derailment Evac = Evacuation

For further information, contact the U.S. Department of Transportation, Research and Special Programs Administration, Materials Transportation Bureau, Washington, D.C.

Exhibit 1-2 Hazardous Materials Movements by WaterFIRE DISTRICT 3 HAZARDOUS MATERIALS (in short tons—1978) **WATERWAYS (VESSELS)**

Hazardous Commodity*	DOT Hazard Classification**	Waterway or Harbor		Total
		Fall River Harbor	New Bedford Harbor	
Residual fuel oil	CL, FL	2,416,731	47,138	2,463,869
Gasoline	FL	952,491	3,363	955,854
Distillate fuel oil	CL, FL	659,423	62,664	722,087
Naptha, petroleum sol.	CL, FL	573,475		573,475
Asphalt, tar & pitches	CL, FL	48,982		48,982
Crude petroleum	CL	33,141		33,141
Jet fuel	CL, FL	31,201		31,201
Petroleum & coal prod.	CL, FL	26,746		26,746
Sulphuric acid	CM	22,300		22,300
Lubricating oils	CL, FL	14,872		14,872
Kerosene	CL, FL	13,689		13,689
Basic chemical & prod.	CM	9,547	42	9,589
Benzene and Toluene	FL	2,537		2,537
Crude tar, oil, gas prod.	CL, FL	894		894
Misc. chemical prod.	CM	317		317
Plastic materials	FL		8	8
Wood manufactures, nec.	CL, FL		4	4
Total Hazardous Material Tonnage*		4,806,029	112,536	4,919,565
Total Waterway/Harbor Tonnage		4,820,427	226,198	5,046,625
% Hazardous Materials		99%	50%	97%
Total Trips of Vessels-Annual*** (Inbound/Outbound)		548/535	771/774	

*The commodity classification scheme used to describe domestic waterborne commerce does not always identify individual hazardous materials. For example, there are commodity groupings—such as Basic Chemicals and Products—which contain materials that are non-hazardous. The total hazardous material tonnages (and percentages) shown, as a result, will almost always be an overestimation of the actual amounts.

**FL = flammable liquid RA = radioactive material
 CL = combustible liquid PA = poison A
 CM = corrosive material PB = poison B
 FG = flammable gas ORM = other regulated material
 OM = oxidizing material

NOTE: Due to the above noted commodity grouping of data, more than one hazard classification may be associated with an indicated commodity.

***These are total vessel trips in and out of the ports identified; they should not necessarily be equated with the number of trips by vessel which carry hazardous material cargoes.

SOURCE: US Army Corps of Engineers, **Waterborne Commerce of the United States: Part I, Waterways and Harbors—Atlantic Coast**, 1978.

Exhibit 1-3 Hazardous Materials Carried by Rail

Hazardous Material	DOT Hazard Classification	Quantity (carloads)
Rail Line: Springfield - W. Springfield		
Combined shipments, NEC	Mixed load	2,776
Vinyl Chloride	Flammable gas	1,067
Propane	Flammable gas	819
Sodium hydroxide liquid	Corrosive material	709
LPG	Flammable gas	518
Carbon dioxide, liquified	Non-flammable gas	416
Chlorine	Non-flammable gas	412
Ethyl alcohol	Flammable liquid	235
Hydrochloric acid	Corrosive material	184
Corrosive liquid, NOS	Corrosive material	106
Rail Line: Springfield - Worcester		
Combined shipments, NEC	Mixed load	2,408
Vinyl Chloride	Flammable gas	1,044
Sodium hydroxide liquid	Corrosive material	488
Carbon dioxide, liquified	Non-flammable gas	362
LPG	Flammable gas	329
Propane	Flammable gas	300
Chlorine	Non-flammable gas	96
Anhydrous ammonia	Non-flammable gas	70
Vinyl acetate	Flammable liquid	67
Potassium hydroxide, liquid	Corrosive material	47

SAMPLE

The above table identifies the top ten hazardous materials carried by the Consolidated Rail Corporation (Conrail) in two major rail corridors in Massachusetts in 1980. Information compiled from Conrail's "HAZMAT1" program.

Exhibit 1-4 Major Manufacturing Industries that Use Hazardous Materials

36 Electrical & Electronic Machinery

3691 Storage Batteries

34 Fabricated Metal Products

3483 Ammunition, exc. for small arms
2851 Paints & Allied Products
2821 Plastic Materials & Resins
3489 Ordnance & accessories

37 Transportation Equipment

3721 Aircraft
3731 Ship Building & Repairing
3743 Railroad equipment

30 Rubber & Plastic Products

3011 Tires & Inner Tubes
3041 Rubber & Plastic Hose
3069 Fabricated Rubber Products
3079 Misc. Plastic Products

26 Paper & Allied Products

2611 Pulpmills
2621 Papermills

28 Chemicals & Allied Products

2812 Alkalies & Chlorine
2813 Industrial Gases
2819 Industrial Inorganic Chemicals
2869 Industrial Organic Chemicals
2873 Nitrogenous Fertilizers
2891 Adhesives & Sealants
2892 Explosives
2899 Chemical Preparations

33 Primary Metals

3312 Blast Furnaces & Steel Mills
3321 Gray Iron Foundries
3325 Steel Foundries
3334 Primary Aluminum
3339 Primary Nonferrous Metals
3361 Aluminum Foundries
3399 Primary Metal Products

24 Lumber & Wood Products

2491 Wood Preservation

29 Petroleum Refining & Related Products

2911 Petroleum Refining

*This listing identifies by SIC Code the major manufacturing industries only which use hazardous materials in their production processes; non-manufacturing industries—such as schools, hospitals, water treatment facilities, etc.—which also utilize hazardous substances are not listed here.

SOURCES: National Wildlife Federation, **Toxic Substances Dilemma**, 1980. US DOT, "Hazardous Materials Demonstration Project Report—Puget Sound Region," Appendix B, 1981.

Exhibit 1-5 Industry-Hazardous Materials Association Table

36 Electrical and Electronic Machinery

3691 Storage Batteries
acids
resins
alcohol
sodium hydroxide

34 Fabricated Metal Products

3483 Ammunition
phosphorus
tetra
ketones
ethanol
phenol
acids (sulfuric)
resins
3489 Ordnance and accessories
same as 3483

37 Transportation Equipment

3721 Aircraft
acids (chromic, hydrofluoric, nitric)
cyanides
solvents and thinners
sodium hydroxide
sodium bisulfate
titanium
resins
3731 Ship Building and Repairing
acids
acetylene
dechlorinated diphenyls
chlorinated naphthalenes
solvents and thinners
resins
3743 Railroad equipment
same as 3731, plus:
sodium hydroxide
sodium bisulfate

30 Rubber and Plastic Products

3011 Tires and Inner Tubes
styrene
ethylene
butyl
neoprene
butadiene
acrylonitrile
polyurethane
resins
3041 Rubber and Plastic Hose
same as 3011

3069 Fabricated Rubber Products
same as 3011

3079 Misc. Plastic Products
resins

26 Paper and Allied Products

2611 Pulp mills
acids (sulfuric, phosphoric)
2621 Paper mills
sodium hypochlorite
calcium hypochlorite
ammonia
chlorine
chloride of lime
sodium hydroxide
potassium hydroxide
sulfur
aluminum sulfate
titanium
resins
2873 Nitrogenous Fertilizers
anhydrous ammonia
ammonia
ammonium sulfate
acids (phosphoric, nitric, sulfuric)
urea
pesticides
herbicides
2891 Adhesives and Sealants
ethyl alcohol
dioxane
ethyl silicate
ketones
dichloroethane
benzene
toluene
2892 Explosives
TNT
mercury compounds
pyridine
anhydrous ammonia
acids (sulfuric, nitric)
ammonium salts
alcohols
ethyl ether
ethanol
ketones
phenols
nitroglycerin
ethylene glycol dinitrate

2899 Chemical Preparations

acids
phenol
alcohol
chlorine
ammonia

33 Primary Metals

3312 Blast Furnaces
hydrogen sulfide
calcium cyanamide
sulfuric acid
lime
metal carbonyls
3321 Gray Iron Foundries
same as 3312
3325 Steel Foundries
acetylene
phosphoric acid
sulfur dioxide
arsenic
ethyl silicate
methyl alcohol
3334 Primary Aluminum
phosphorous
acetylene
arsenic
chlorine
nitric acid
hydrogen sulfide

24 Lumber and Wood Products

2491 Wood Preservation
chlorophenols
chromates
creosote oil
mercuric chloride
resins

29 Petroleum Refining and Related Products

2911 Petroleum Refining
sulfuric acid
sodium hydroxide
aluminum chloride
hydrofluoric acid
kerosene
gasoline
solvents

Exhibit 1-5 Industry-Hazardous Materials Association Table (continued)

28 Chemicals and Allied Products
2812 Alkalies and Chlorine

acids (hydrochloric, hydrofluoric,
nitric, phosphoric, sulfuric)
anhydrous ammonia
chlorine
potassium hydroxide
phosphorus
sodium hydroxide
alcohol, ethyl
benzene

2813 Industrial Gases

acetylene
liquid oxygen
hydrogen
propane
butane

2819 Industrial Inorganic Chemicals

acids (hydrochloric, phosphoric,
nitric, sulfuric)
anhydrous ammonia
chlorine
sodium hydroxide
benzene
formaldehyde
phosphorus
sulfur dioxide
carbon disulfide
hydrogen peroxide

2821 Plastic Materials and Resins

acrylonitrile
alcohols
formaldehyde
glycerin
butadiene
ethylene
phenol
phthalic anhydride
sodium hydroxide
styrene
acids (acetic, sulfuric)
urea
vinyl acetate
vinyl chloride
resins
ketones
benzyl chloride
chlorine
toluene
carbon disulfide

2851 Paints and Allied Products

alkalies
aluminum compounds
ammonia
benzene
carbon disulfide
thinners (naphtha, toluene)
solvents (butyl acetate,
trichloroethylene, etc)

styrene
glycerine
phthalic anhydride
ketones
dioxane
mercury compounds
phenol
sulfuric acid
tetrachloroethane
turpentine
xylene
ethyl silicate

2869 Industrial Organic Chemicals

toluene
alcohols (butyl, ethyl)
methanal
acetone
carbon disulfide
solvents
naphthalene
ketones
ammonia
acids (hydrochloric, hydrofluoric,
nitric, phosphoric, sulfuric)
chlorine
phosphorus
sodium hydroxide
benzene
phenol
phthalic anhydride
propane

Exhibit 1-6 Industry Survey of Hazardous Materials: General Form

Appendix II Exhibits

FORM COMPLETION GUIDE HAZARDOUS MATERIALS SURVEY

Following are suggestions for completing the Hazardous Materials Survey form by section. Please type or print with a soft lead pencil or felt tip pen to aid in reproduction for our local fire company file.

- Street address with nearest cross street in parenthesis.
- Your Firm's name.
- Phone numbers where we can reach someone for help in the event of an emergency during off hours.
- Hazardous Materials
 - We are interested in listing hazardous materials found on your site and anything stored in quantity even though we don't need to worry about it, e.g., we consider a bulk tank dangerous until we know what the tank contains.
 - We recognize that some facilities, especially warehouses, handle and store differing quantities of material during the year. We suggest listing a typical product mix highlighting the season in the comment section.
 - Form:
 - Liq. - Liquid
 - P. Liq. - Pressurized liquid
 - Solid - Solid
 - Gas - Gas
 - P. Gas - Pressurized Gas
 - Volume: Ballpark estimates of the quantity we might have to deal with in an emergency. Please show units, e.g. lbs., gals, cu.ft., etc.
 - Hazardous materials will include flammables, corrosives, toxic or poison materials, oxidizers, radioactive materials, explosives, combustibles, etiological agents, combustible metals, cryogenics, unstable materials, pesticides, fumigants and any other materials requiring special handling or storing precautions or which present added risks in an emergency.
 - Hazards: Hazard types, how stored (bags, drums, bulk), or anything else you feel may help us manage an emergency involving this material.

SAMPLE



CITY of MEMPHIS

WYETH CHANDLER
MAYOR

DIVISION OF FIRE SERVICES

MEMPHIS FIRE DEPARTMENT HAZARDOUS MATERIALS INFORMATION REQUEST

Memphis and Shelby County is a major transportation center and an ever increasing volume of hazardous materials are being transported, processed, and stored in our community. Accidents involving hazardous materials are also increasing with a subsequent greater risk to our firefighters and the citizens and workers of our community.

We are concerned. Our Memphis Fire Department Hazardous Materials REACT Team, which serves the entire metropolitan area, is now being called into service on a frequency approaching once each day for emergencies involving hazardous materials. Incidents are becoming more serious as well as more numerous.

We need your help. In an effort to face this problem squarely, we are launching a multipronged effort to identify and assess hazardous materials and develop strategies to minimize risks.

We ask that you help us by completing the attached form. We hope to adopt this form for use by all of our inspectors, but it would be some time before we could cover the majority of businesses. The form is as simple as we could make it and included are a separate set of instructions and a sample completed form.

We would very much appreciate your completing this form for us so that we can rapidly improve our references when responding to hazardous materials incidents. We hope that we never have such a call to your location, but if we do, we will be much better equipped to manage the emergency and bring it to a safe conclusion quickly.

We have an excellent working relationship with our business citizens that we value highly. We are confident that your help now will help us face this difficulty squarely and help us achieve our goal of providing first rate service.

Please return the form and other appropriate information by November 10, 1980 to Captain J.W. Covington, Memphis Fire Department, 2668 Avery, Memphis, Tenn. 38112. If you have any questions or comments, please call Captain Covington or Inspector H.T. Sharp at 458-4024.

Thanks again.

SAMPLE

Robert W. Walker
Robert W. Walker, Director

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FIRE DEPARTMENT HEADQUARTERS . 45 SO FRONT . MEMPHIS, TENNESSEE 38103

Exhibit 1-6 Industry Survey of Hazardous Materials: General Form (continued)

Appendix II Exhibits

MEMPHIS FIRE DEPARTMENT
HAZARDOUS MATERIALS SURVEY

A. STREET ADDRESS 1245 Main Street (Ft. Ave.)

B. NAME OF PREMISES Mid South Mfg. Co.

C. EMERGENCY CONTACTS:

NAME	BUSINESS NO.	HOME TELEPHONE NUMBER
John Doe, Production Mgr.	555-1000	555-2121
Joe Smith, V.P.	555-1000	555-4121
Pete Jones, Pres.	555-1000	555-2174

D. HAZARDOUS MATERIALS

	MATERIALS	FORM	VOLUME	HAZARDS/COMMENTS
1.	Propane	P. Gas	30,000 gal.	Flammable/tanks half buried
2.	Triethylamine	liq.	20,000 gal.	Flammable, Irritant, is dose toxic
3.	Sulfuric Acid	liq.	20,000 gal.	Corrosive, Reacts with H ₂ O or organic
4.	Fuel Oil	liq.	15,000 gal.	Combustible
5.	Vegetable Oil	liq.	15,000 gal.	Non-Hazardous
6.	Acetone	liq.	10-55 drum	Flammable
7.	Acetic Acid	liq.	5-55 drums	Flammable, Corrosive, Irritant
8.	Ammonium Nitrate	Solid	3-50 bags	toxic reacts with oxidizers, Oxidizer, Gases Toxic, unstable in fire, may detonate
9.	Stoddard Solvent	liq.	30 gal. drum	Flammable
10.	Various Fumigant	Solid	20 lbs.	Toxic (Spring & Summer only)
11.	Grease/Lubricant	Sol/liq.	2-55 drums	Non-hazardous
12.	Gasoline	liq.	6-5 cans	Flammable
13.				
14.				
15.				

E. TYPE CONSTRUCTION Warehouse-block, office-wood

F. AUXILIARY FIRE PROTECTION 15-5 gal. cans of alcohol type foam in shed along east fence.

G. WATER SUPPLY City and Winding Creek on First Avenue

H. ACCESS TO PROPERTY Main Street to the South, First Avenue to the West, can approach east fence from Maple.

I. EXPOSURES North-Creek, East-Residential, South-Commercial, West-Commercial

J. LIFE HAZARD Residential area to East, Elementary School 3/4 mile North

K. CROSS HAZARD area, 1 employee-tank farm, 9-Warehouse/Mfg.

L. WATER RUNOFF Earthen dike along North with pump along North fence. Sump has a gate which can be closed.

Page 2

- We suggest that you list the hazardous materials you handle in decreasing order, especially explosives, water reactives and poisons or toxic materials, excluding those with relatively low hazard and low volume, remembering that non-hazardous materials stored in bulk are of interest as well. Use additional sheets if necessary.
- E. Construction is an important consideration in firefighting on interior structures; e.g. block, wood, open steel, concrete slab, open truss roof support, etc. Please complete if applicable.
- F. Do you have any special fire protection features beyond city hydrants and hand extinguishers that would help us? If so, please list them; e.g. wet sprinkler system, deluge system, nitrogen padding, smoke vents in a warehouse, foam, injection connection, wheeled 150 lb. extinguisher, etc.
- G. Tell us if you have any water supply beyond municipal hydrants including private storage and pump systems or a spot within 15 ft. vertical and 20 ft. horizontal distance of a pond or stream.
- H. Access from several directions is important, can we get to your site from a route other than the normal one used?
- I. Exposures: What other facilities could become involved if preventive action is not taken? Is a residential or commercial area nearby?
- J. Life Hazard: Where would your people be? How many? Hospital or school nearby? Where are the people?
- K. Water runoff becomes critically important if it allows the incident to spread creating dangers downstream or within the sewer system. We need to know what the runoff path will be and can it be blocked or a dam erected to prevent runoff.
- L. Do you have and where are any switches or valves located remotely which would allow us to stop flows quickly and safely?
- M. Additional remarks allows a space for anything else you think would be helpful to us.
- N. In the facility sketch section we would like to see where the materials are relative to other site features. We would appreciate a drawing of your facility as a substitute. However, we do not need a detailed drawing and would be very pleased with a freehand sketch showing relative distances, key tanks or storage areas, shutoffs, access, private fire protection connections and runoff dam sites.
- O. If you have Material Safety Data Sheets or Product Bulletins on the products you've listed, please send us copies.
- P. We would like to know who supplied the information on this form so that if questions arise we have someone to contact. The other signature blocks are to assure that key individuals within the Memphis Fire Department have reviewed the form.

SAMPLE

Exhibit 1-6 Industry Survey of Hazardous Materials: General Form (continued)

Appendix II Exhibits

MEMPHIS FIRE DEPARTMENT
HAZARDOUS MATERIALS SURVEY

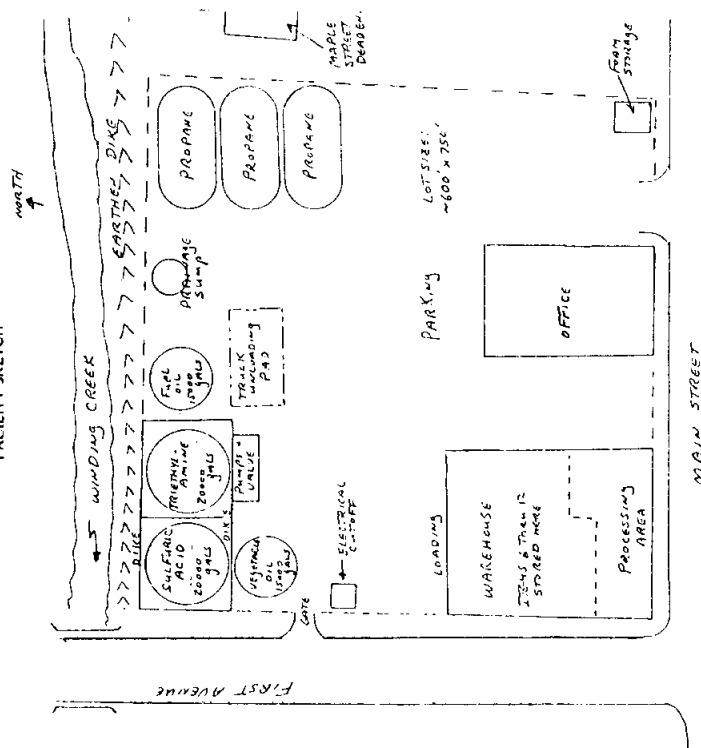
Page 2

L. PERTINENT VALVES OR SWITCHES All transfer valves and unloading pumps can be shut off by pulling the marked disconnect inside the West Gate

M. ADDITIONAL REMARKS

N. HAZARDOUS MATERIALS SURVEY

FACILITY SKETCH



O. MSDS OR PRODUCT BULLETINS AVAILABLE Some ATTACHED Yes

P. INFORMATION PROVIDED BY John Doe, Prod. Mgr. DATE 10/1/80

REVIEWED BY:

FIRE MARSHAL

REACT TEAM

DISTRICT CHIEF

COMPANY COMMANDER

DATE

DATE

DATE

DATE

SAMPLE

Exhibit 1-7 Industry Survey of Hazardous Materials: Detailed Form

Appendix II Exhibits

MATERIAL SAFETY DATA SHEET (DRAFT)

COMPANY NAME _____ MATERIAL NAME _____
 ADDRESS _____ DATE _____
 PHONE _____
 REPRESENTATIVE _____
 POSITION _____

MATERIAL DATA

MANUFACTURER'S NAME		EMERGENCY TELEPHONE NO.
ADDRESS (Number, Street, City, State, and ZIP Code)		
CHEMICAL NAME AND SYNONYMS		TRADE NAME AND SYNONYMS
CHEMICAL FAMILY	FORMULA	
CFR HAZARD CLASS	PLACARD	
TRANSPORTATION MODE(S) UTILIZED	TRIPS GENERATED	
ON-SITE STORAGE CAPACITY	AVERAGE STORAGE VOLUME	

PHYSICAL DATA

BOILING POINT (°F.)	SPECIFIC GRAVITY (H ₂ O=1)
VAPOR PRESSURE (mm Hg.)	PERCENT. VOLATILE BY VOLUME (%)
VAPOR DENSITY (AIR=1)	EVAPORATION RATE (_____*1)
SOLUBILITY IN WATER	
APPEARANCE AND ODOR	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Let	Uet
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			

Adopted Form OSHA-20

THRESHOLD LIMIT VALUE
EFFECTS OF OVEREXPOSURE
EMERGENCY AND FIRST AID PROCEDURES

REACTIVITY DATA

STABILITY	UNSTABLE	CONDITIONS TO AVOID
	STABLE	
INCOMPATIBILITY (Materials to avoid)		
HAZARDOUS DECOMPOSITION PRODUCTS		
HAZARDOUS POLYMERIZATION	MAY OCCUR	CONDITIONS TO AVOID
	WILL NOT OCCUR	

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
WASTE DISPOSAL METHOD

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)		
VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General)	OTHER
PROTECTIVE GLOVES		EYE PROTECTION
OTHER PROTECTIVE EQUIPMENT		

SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
OTHER PRECAUTIONS

SAMPLE

SAMPLE



Exhibit 1-8 Sample Road Survey Form

FORM 1. MANHATTAN ROAD SURVEY FORM

Location U.S. 24 and Poyntz Ave.Date June 18, 1980Recorder Tom Phillips

Time	Vehicle Type				Placard Type
	Truck		Rail		
	Non-Tanker	Tanker	Non-Tanker	Tanker	
7:16 am	X				Flammable
8:03		X			Flammable
8:56		X			Flammable
9:41	X				Corrosive
10:04		X			Combustible
10:24	X				Flammable
10:32		X			Flammable
10:55		X	SAMPLE		Flammable
12:00 pm		X			Combustible
12:45		X			Combustible
1:45		X			Flammable
2:10		X			Flammable
2:30		X			Flammable
3:15		X			Flammable
5:18		X			Combustible

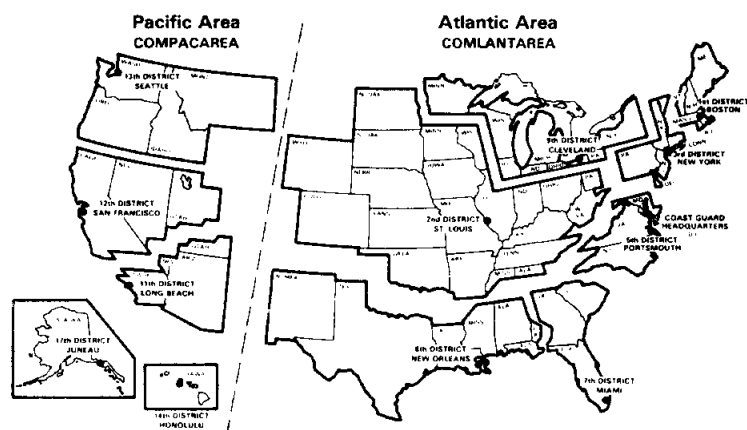
Exhibit 1-9 Santa Clara Fire Department Chemical Hazards Assistance Program

<p>Uniform Fire Code Amendments</p> <p>As an extension of the Chemical Program and with the approval of the City Council, the Fire Department amended the U.F.C. to include the following additions:</p> <p>Section 80.103 (f):</p> <p>"When required by the Chief, areas containing hazardous materials shall be identified. Such identification may include signs, color coding, posting lists of materials, or other notice as may be deemed necessary.</p> <p>"An inventory of hazardous chemicals shall be provided to the Fire Department for their records and said list shall identify the location of use and storage. Any change to the list shall be submitted to the SCFD within 15 days after the change occurs. Chemical data safety information shall also be provided.</p> <p>"Where hazardous materials are stored or used, the owner will be required to provide on-site materials and equipment necessary for containment, neutralization and removal, including necessary safety equipment for personnel. An inventory of the above items shall be provided to the Fire Department.</p> <p>"Safety equipment used by personnel for fire fighting or chemical spill emergencies shall be compatible with the same equipment used by the Santa Clara Fire Department.</p> <p>"Exception — Equipment already in existence but not compatible with Santa Clara Fire Department equipment, but easily adaptable, shall have adapters available."</p>	<p>If you have any questions or problems relating to hazardous and toxic materials, or if we can assist you in any way developing effective plans for handling, storing or disposing of chemical materials, CALL THE CHEMICAL DIVISION OF THE FIRE DEPARTMENT.</p> <p>We look forward to working with you and in creating a safer living and working environment in the City of Santa Clara.</p> <p style="text-align: center;">TELEPHONE NUMBERS</p> <table border="1"> <tr> <td>Chemical Division</td> <td>984-3084</td> </tr> <tr> <td>Fire Prevention</td> <td>984-3061</td> </tr> <tr> <td>Technology Action Center</td> <td>984-3138</td> </tr> </table>	Chemical Division	984-3084	Fire Prevention	984-3061	Technology Action Center	984-3138	  <p style="text-align: center;">SANTA CLARA FIRE DEPARTMENT CHEMICAL HAZARD ASSISTANCE PROGRAM</p>
Chemical Division	984-3084							
Fire Prevention	984-3061							
Technology Action Center	984-3138							

<p>Why The Program Was Developed</p> <p>After experiencing some major alarm fires, where both firefighters and citizens were injured due to their exposure to toxic chemicals, the Fire Department decided to study the problem and develop solutions that would help reduce the actual or potential problems that they faced. The first major step in identifying the problem was to conduct a survey of each business building to determine the kinds and quantities of chemicals that are used or stored in the City.</p> <p>Study Results</p> <p>After identifying the amount and kinds of chemicals being used and stored in the City, the Fire Department recognized that it had neither the expertise nor equipment to deal with chemical emergencies.</p> <p>Also identified was a need for education and training for both firefighters and industrial employees. The training should emphasize safe storage and handling of hazardous and toxic materials.</p> <p>The need for a planned program to identify and reduce actual or potential problems involving hazardous and toxic chemicals while protecting industry's confidential information was recognized.</p> <p>Benefits To All Businesses</p> <ol style="list-style-type: none"> 1. Reduce lost time from a chemical incident for the company involved and others in the vicinity. 2. Assistance provided to all companies regardless of size in identifying possible hazardous chemicals on the premises. 3. Reduce toxic fume incidents affecting the physical well-being of the surrounding neighborhood. 4. The regular inspection program provides safety information and education in areas of hazardous materials, their storage, handling, and disposal. 	<p>Program Goals</p> <p>Unlike any other program known, Santa Clara Fire Department worked with industrial representatives through the Chamber of Commerce to develop the City's plans:</p> <ol style="list-style-type: none"> 1. Create, within the Fire Department a Chemical Division manned by specialists. 2. Work with a Chemical Task Force formed through the Chamber of Commerce. 3. Create, within the Fire Department operational plans and capabilities for dealing with chemical hazard incidents in the City. 4. Support the development of educational programs for Fire Department personnel, industry and the community. 5. Support the creation of a "Center of Excellence" for research, testing and information retrieval, relating to hazardous chemicals. <p>Program Funding And Utilization</p> <p>The Chemical Hazard Assistance Program is developed to reduce or eliminate the hazards associated with chemicals. Its funding comes from the business and industrial community through an approved fee structure. In addition, the Fire Department is continually researching alternative sources for funding/assistance to support on-going operational and informational needs of the program for its users and supporters.</p>	<p>Chemical Division Services</p> <p>Most important to the success of the Chemical Program is the philosophy under which the Chemical Division functions. Our position is to provide a service and develop solutions rather than emphasizing enforcement.</p> <ol style="list-style-type: none"> 1. Respond to chemical emergencies and provide on-site expertise to firefighting personnel. 2. Provide follow-up consultation with businesses after a chemical emergency to correct or reduce the likelihood of a recurrence. 3. Provide inspections and consultations for the identification of actual or potential problems and work cooperatively for effective solutions. 4. Provide resource information through the Technology Action Center of the Chamber of Commerce. 5. Provide an interface with other governmental agencies. 6. Provide a Chemical Assistance Response Vehicle which contains specialized detection and protective equipment, abatement materials and a library of information. 7. Provide information regarding acceptable standards and codes for the use and storage of chemical materials. 8. Provide and identify training and education programs for firefighters and industry. 9. Provide a resource for business and industry in dealing with chemical related problems that they may encounter.
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For additional information, contact Don Visconti, Fire Chief, Santa Clara Fire Department, 777 Benton Street, Santa Clara, California 95050.

Exhibit 2-1 U.S. Coast Guard Regions



1st Coast Guard District
150 Causeway Street
Boston, MA 02114

2nd Coast Guard District
Federal Building
1430 Olive Street
St. Louis, MO 63103

3rd Coast Guard District
Governors Island
New York, NY 10004

5th Coast Guard District
Federal Building
431 Crawford Street
Portsmouth, VA 23705

7th Coast Guard District
Room 1010
Federal Building
51 SW First Avenue
Miami, FL 33130

8th Coast Guard District
500 Camp Street
Hale Biggs Building
New Orleans, LA 70130

9th Coast Guard District
1240 East 9th Street
Cleveland, OH 44199

11th Coast Guard District
Union Bank Building
402 Oceangate Blvd.
Long Beach, CA 90822

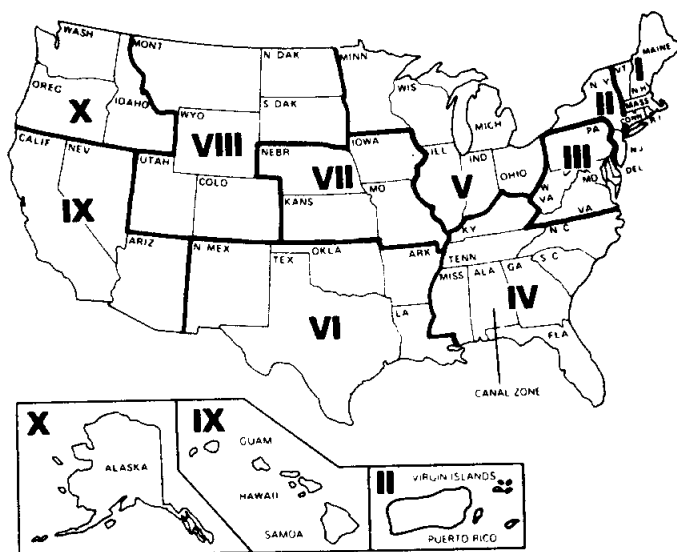
12th Coast Guard District
630 Sansome Street
San Francisco, CA 94126

13th Coast Guard District
Federal Building
915 Second Avenue
Seattle, WA 98174

14th Coast Guard District
9th Floor
Prince Kalaniana'ole Fed. Bld.
300 Ala Moana Blvd.
Honolulu, HI 96850

17th Coast Guard District
P.O. Box 3-5000
Juneau, Alaska 99802

Exhibit 2-2 EPA Regional Emergency Response Offices



Region I

Chief, Oil & Hazardous Materials Section
Surveillance and Analysis Division
60 Westview Street
Lexington, MA 02173

Region II

Chief, Emergency Response and Hazardous Materials
Inspection Branch
Environmental Services Division
Edison, NJ 08837

Region III

Chief, Environmental Emergency Branch
Curtis Building 3ES30
6th & Walnut Streets
Philadelphia, PA 19106

Region IV

Chief, Emergency Remedial & Response Branch
345 Courtland Street, NE
Atlanta, GA 30365

Region V

Chief, Spill Response Section
Environmental Services Division, 5SEES
536 South Clark Street
Chicago, IL 60605

Region VI

Chief, Emergency Response Branch, 6ESE
First International Building
1201 Elm Street
Dallas, TX 75270

Region VII

Chief, Emergency Planning & Response Branch
Environmental Services Division
25 Funston Road
Kansas City, KS 66115

Region VIII

Chief, Emergency Response Branch
Environmental Services Division
1860 Lincoln Street
Denver, CO 80295

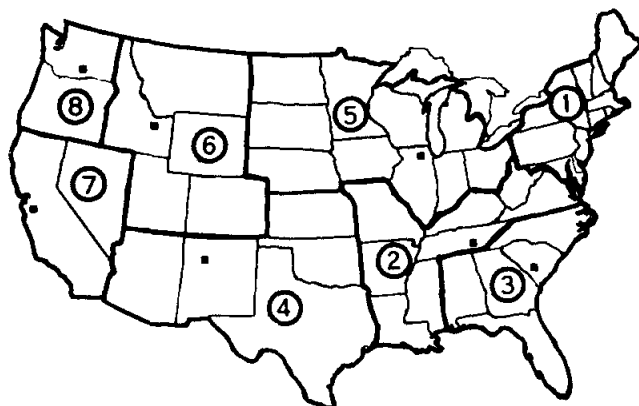
Region IX

Chief, Emergency Response Section, T-3-3
Compliance & Response Branch
Toxic & Waste Management Division
215 Fremont Street
San Francisco, CA 94105

Region X

Chief, Environmental Emergency Response Team
Environmental Services Division
1200 6th Avenue
Seattle, WA 98101

Exhibit 2-3 FRMAP Regions



Puerto Rico, Virgin Islands—Region II
Hawaii—Region VII
Alaska—Region VII.

Region 1

Upton, L.I.
New York, NY 11973

Region 2

P.O. Box E
Oak Ridge, TN 37830

Region 3

P.O. Box A
Aiken, SC 29801

Region 4

P.O. Box 5400
Albuquerque, NM 87115

Region 5

9300 S. Cass Avenue
Argonne, IL 60349

Region 6

P.O. Box 2108
Idaho Falls, ID 83401

Region 7

2111 Bancroft Way
Berkeley, CA 94704

Region 8

P.O. Box 550
Highland, WA 99352

Exhibit 2-4 Hazardous Materials Assistance Commonly Available at State Agencies

Agency	Assistance Commonly Available
Civil Defense	Communications, coordination, evacuation, radiological monitoring
State Police	Traffic control, communications, evacuation
Environmental	Chemists, environmental scientists, meteorologists, lab services, some equipment, knowledge of contractors
Public Works	Construction equipment and operators
Public Health	Health specialists
Agriculture	Pesticide and/or fertilizer experts
Fire Marshall or Fire Academy	Fire suppression advice

Exhibit 2-5 Hazardous Materials Assistance Commonly Available at Local Agencies

Agency	Assistance Commonly Available
Fire Department	Trained firefighters and specialized equipment for (a) suppressing fires, (b) rescuing injured or trapped persons, and (c) dealing with select hazardous materials.
Public Works Department	Equipment and personnel to contain spills by digging trenches or constructing dikes. Can usually provide sand—an excellent sorbent for spilled hazardous materials.
Police	Communications equipment and traffic/ crime control at scene of spill.
Civil Defense	Equipment for monitoring radioactivity. Will usually coordinate the response of various agencies.
Public Health Agency	Advice on the chemical properties of the material and human health effects.

Exhibit 2-6 Industry Sources of Hazardous Material Emergency Response Equipment

Equipment Type	Chemical	Oil Refining Storage	Construction	Transportation	Pollution Cleanup Contractor
Personal Protection	P	P	N	N	P
Communications	P	P	N	P	P
Environmental Monitoring	P	P	N	N	P
Fire Fighting	P	P	N	N	N
Sorbents	P	P	N	N	P
Construction Equipment	N	N	P	N	P
Containment Devices	N	P	N	N	P
Chemical Agents	P	P	N	N	P

P = possible equipment source

N = not a probable equipment source

Exhibit 2-7 Industry Sources of Hazardous Material Emergency Response Personnel

Personnel Type	Chemical	Oil Refining Storage	Construction	Transportation	Pollution Cleanup Contractor
Firefighters	P	P	N	N	N
Equipment Operators	N	N	P	N	P
Hazardous Materials Specialists	P	P	N	N	N
Chemists	P	P	N	N	N
Evacuation	N	N	N	P	N

P = possible source of personnel

N = not a probable source of personnel

**Exhibit 2-8 Industry Groups Organized for Hazardous Materials
Emergency Response**

Group	Function	Incidents	Number
Chemtrec	Provides information and liason between responding groups	All incidents involving hazardous materials	1-800-424-9300 1-202-483-7616 for call from outside the continental US 483-7616 for call within Washington DC
Chlorine Emergency Plan	Provides teams and equipment	Chlorine incidents (US and Canada)	Contact through CHEMTREC
National Agriculture Chemicals Association (NACA) Pesticides Safety Team Network	Provides teams trained in emergency response	Pesticide incidents	Contact through CHEMTREC

Exhibit 2-9 Area Fire Department Survey Form

WYETH CHANDLER
MAYOR

CITY of MEMPHIS



DIVISION OF FIRE SERVICES

November 10, 1982

SAMPLE

Dear Chief,

As part of the ongoing hazardous materials incident response training program being conducted by the Memphis Fire Department and the Department of Transportation (DOT), we are asking your cooperation in completing the enclosed survey.

Replies will be used for two purposes. The first will give an area-wide total survey of equipment, facilities and manpower, and secondly, we will have a complete catalog of these available.

All participating fire departments will be given a copy of the final survey report. This in effect, will serve as a catalog of equipment in the Memphis metropolitan area which may be needed to handle a hazardous materials incident or any other major disaster which may occur within your jurisdiction.

Your participation in this project is necessary in order for us to have a complete product. If you have any questions, please contact me at 458-8281, Ext. 366 or 367.

Thank you very much for your cooperation.

Sincerely yours,

A handwritten signature in cursive script, reading "Richard M. Adelman".

Richard M. Adelman
Chief of Training
Memphis Fire Services

jj
enc.

FIRE DEPARTMENT HEADQUARTERS - 65 SO. FRONT - MEMPHIS, TENNESSEE 38103

Exhibit 2-9 Area Fire Department Survey Form (continued)

INVENTORY FIRE SUPPRESSION & RESCUE EQUIPMENT & PERSONNEL
FIRE SERVICE ORGANIZATIONS, SHELBY COUNTY, TENN. & VICINITY

1. Municipality: _____ County: _____ State: _____
2. Fire Dept. Mailing Address _____ Zip _____
3. Fire Dept. Business Tele. _____ Emergency No. _____
4. Fire Chief _____ 24 Hr. Tele. No. _____
5. Asst. Chief _____ 24 Hr. Tele. No. _____
6. EMS Chief _____ 24 Hr. Tele. No. _____
7. HAZMAT Chief _____ 24 Hr. Tele. No. _____
8. Police Chief _____ 24 Hr. Tele. No. _____
9. Public Wks. Dir. _____ 24 Hr. Tele. No. _____
10. Water Dept. Supt. _____ 24 Hr. Tele. No. _____
11. Full time F/F _____ No. Active Vols. _____ No. full time EMS/
paramedics (Do not include in full time F/F) _____ Vol. EMT/
paramedics _____.
12. Does your dept. have 24 Hour dispatchers? _____ If not, how is your
dispatching handled? _____
13. What is your dept's primary radio frequency? _____
What is your dept's handi-talkie frequency? _____
Other frequencies & purpose? _____
14. Number mobile (vehicle) radios _____ hand held _____ pagers _____
base station(s) location: _____
15. Nearest hospital _____
16. If a gas pipeline runs through your community, who can you contact in
an emergency, what is telephone No. _____
17. Apparatus & equipment inventory: Please complete the inventory form
on the following page(s). Accuracy is important. List all apparatus,
first line & reserve & all types: pumpers, aerials, tankers, brush
trucks, ambulances, etc.

SAMPLE

Page 2

[illegible]

Page 3

[illegible]

Exhibit 2-9 Area Fire Department Survey Form (continued)

18. No. smoke ejectors in dept. _____
19. No. portable generators in dept. _____
20. No. Hurst tools in dept. _____
21. No. rescue saws in dept. _____
22. No. chain saws in dept. _____
23. No. portable pumps. _____
24. Heavy machinery & equipment:
- _____ Dump trucks & drivers available _____ hours notice
- _____ Front end loaders & drivers available _____ hours notice
- _____ Bulldozers & drivers available _____ hours notice
- _____ Backhoes & drivers available _____ hours notice
- _____ Air compressors & operators available _____ hours notice
- _____ Fork lifts & operators available _____ hours notice
- _____ Buses or school buses & drivers available _____ hours notice
- _____ Tons sand available, _____ hours notice
- _____ Heavy duty wreckers & crews available _____ hours notice
- _____ Air lifting bags available _____ hours notice
25. Law enforcement agencies:
- _____ Number local police officers usually on duty
- _____ Number police cars usually on street
- _____ Additional local police officers available 1-2 hours notice
- _____ Additional police cars available 1-2 hours notice
26. Hydrant information:
- (a) 2½" hose thread is _____ NST or other _____
- (b) Steamer connection size is _____ inches
- (c) Steamer connection thread is _____
- (d) Hydrant operating nut size & shape _____

SAMPLE

Exhibit 2-9 Area Fire Department Survey Form (continued)

27. Fire service personnel:

_____ Number fire fighters usually on duty
_____ Average number volunteers responding per call
_____ Additional personnel available 1-2 hours notice

28. Breathing air supplies:

(a) Can your dept. refill breathing air cylinders? _____
(b) If so, how accomplished (cascade or cascade-compressor) _____
(c) Is system fixed or mobile? _____
(d) Approximately how many 30-min. bottles can system refill in one hour? _____

29. Other equipment: Check if your dept. has any of the following equipment in service & qualified operators available:

(a) Radiological detection & monitoring equipment _____
(b) Combustible gas indicator or explosimeter _____
(c) Chemical suit _____
(d) Wood plugs & wedges _____
(e) Nomex protective clothing _____
(f) Air chisel kit _____

SAMPLE

30. Name of person filling out survey form _____
Mailing address _____ Zip _____
Telephone Number _____

PLEASE RETURN TO TRAINING BUREAU, MEMPHIS FIRE DEPARTMENT NO LATER THAN DECEMBER 1, 1982.

THANK YOU.

Exhibit 2-10 Virginia Hazardous Materials Van Contents

- 4 sets firefighters clothing (pants, coat - 7.5 oz. Nomex, yellow)
- 18 sets vinyl spray suits (bib pants, coats)
- 6 Cairns firefighters helmets
- 12 hardhats (NIOSH, MESA dielectric)
- 6 sets gloves (5 pr. set)
 - 1 pr surgical gloves
 - 1 pr neoprene fuel handling
 - 1 pr nitrile rubber
 - 1 pr insulated glo-glove
 - 1 pr kynol lined, leather firefighter
- 12 sets Tyvek coveralls (includes hoods, shoe covers)
- 6 pr 3/4 length Uniroyal firefighters boots
- 6 pr Uniroyal leggin boot
- 12 Sorbent pads (1 gallon pillow)
- 25 lb dry sorbent
- 1 Matheson-Kitagawa Detector
- 2 sets radioactive equipment
 - Civil Defense: alpha, beta, gamma detectors
 - Ludlum Industries: alpha, beta, gamma detectors
 - Handling tongs
 - dosimeters and chargers
- 6 Scott Air Pak II, 30 minute breathing apparatus
- 2 Scott Air Pak II, reserve air bottles
- 4 AO Full Face Respirators
- 1 wet/dry vacuum
- 1 Fyrepel butyl rubber acid suit
- 1 Fyrepel aluminized cover suit for butyl suit
- 1 20 lb ABC fire extinguisher
- 1 Stephenson resuscitator
- 1 Bullard Safety First Aid Station
- 6 hand lights (MESA, NIOSH, Bureau of Mines approved)
- 10 equipment boxes
 - 1 microfiche reader
 - 1 telephone w/ line tap
 - 1 technical library kit
 - 1 set assorted tools, non-sparking
 - 2 100 ft extension cord
 - 4 KW ONAN GENERATOR
- 1 CB radio
- 1 Modar Triton Marine Radio
- 1 Touch M-100 scanner
- 1 standard tool set
- 1 non-sparking tool set
- 1 Bastehtor Model 1214 detector
- 1 law enforcement radio
- 1 8 channel agency/EMS/hospital/SAR radio
- 1 Aviation Radio (air-ground)

SOURCE: Commonwealth of Virginia, Department of Emergency Services.

Exhibit 4-1 Hazardous Materials Training Courses

The Hazardous Materials Compliance and Enforcement Training Course

Phase I: Self-study student manual, Title 49 (CFR), and qualifying exam. (Approximately 5 days study)

Phase II: In-class instruction, work projects and practice in use of 49 (CFR). (5 days)

Contents:

- Introduction & Legal Aspects
- Organization & Introduction to 49 CFR
- Shipper Functions
 - Definitions
 - Packaging
 - Marking
 - Labeling
 - Shipping Papers
 - Placarding
- Modal Requirements
- Hazardous Substances & Wastes
- Inspection Procedures
- Cargo Tanks
 - Certification
 - Qualifications
 - Specifications
 - Inspection Procedures
- Radioactive Materials
- Roadside Inspection Procedures
- Enforcement & Inspection Field Problems

- Citing Noncompliance
- Investigation Planning & Procedures
- International Civil Aviation Organizations (ICAO)
- International Maritime Organizations (IMO)

Cargo Tanks—Compliance and Enforcement Course

Phase I: Student manual and qualifying examination. (Approx. 2½ days study)

Phase II: In-class instruction, work projects and hands-on application (49 CFR). (3 days)

Contents:

- 49 CFR
- Construction Considerations
- Specifications
- Systematic Inspection Procedures
- Common Defects
- Field Inspection Projects
- Certification, Testing, Records
- Cryogenic Cargo Tanks
- Non-specs., Portable, IM and Vacuum Tanks

These courses are sponsored/offered by Materials Transportation Bureau (MTB); taught by staff of Transportation Safety Institute (TSI) at state-provided facilities.

Hazardous Materials In-Depth

A 10-day training course offered by the Colorado Training Institute, Denver, CO

Contents:

- | | | |
|-------------------------------------|---|-----------------------------------|
| • Code of Federal Regulations | • Cargo Tanks | • Chlorine and Chlorine Compounds |
| • Agencies Available for Assistance | • Petroleum Spills | • Anhydrous Ammonia |
| • Industrial Chemicals | • Organic Peroxides | • Radioactive Materials |
| • Acids/Alkalies | • Compressed Gas, Flammable & Combustible Liquids | • Protective Equipment |
| • Explosives | • Pesticides | • Rail Tank Incidents |
| • Electrical Hazards | • Cryogenics | • Containment |
| • Pipeline Transportation | • Poison Gas | • Contingency Planning |
| • Specification Carriers | | • Evacuation |

Exhibit 4-2 Hazardous Materials Knowledge Matrix

Rating Scale	
1-Comprehensive knowledge of	
2-Basic knowledge of:	
3-Partial knowledge of	
Required Knowledge	
Individual	Public Media
1. The existence and intent of US Department of Transportation (DOT) Regulations governing the shipment of hazardous materials	2
2. The application of US DOT regulations governing the shipment of hazardous materials and the ability to comply or recognize compliance	2
3. The existence and intent of the regulations and the structure of the Environment Protection Agency (EPA) relative to hazardous materials	2
4. The application of EPA regulations governing hazardous materials incidents and the ability to comply or recognize compliance	2
5. The existence and intent of the regulations and structure of the Nuclear Regulatory Commission (NRC) relative to hazardous materials	3
6. The application of the NRC regulations governing the shipment of hazardous materials and the ability to comply or recognize compliance	3
7. The applicable hazardous materials incident response plans	2
8. The development of appropriate hazardous materials incident response plans	2
9. All pertinent Standard Operating Procedures (SOP) relative to a hazardous materials incident	2
10. The development of the applicable hazardous materials incident SOP's in accordance with response plans.	2
11. The proper information and procedure for responder to dispatcher transmissions including destination and ultimate use of information	1
12. The information that Chemical Transportation Emergency Center (CHEMTREC) needs to accurately and effectively assist in the incident.	1
13. The reporting procedure including report flow, content and format, following a hazardous materials incident	1
14. The recognition or identification of hazardous materials from shipping papers, such as, con disc, bill of lading and manifest.	1
15. The general types of hazardous materials based on the shape, color, type and other physical characteristics of the container.	1
16. The DOT hazardous materials classification system based on displayed placards	1

For additional information, contact the Puget Sound Council of Governments, 216 First Avenue South, Seattle, Washington 98104.

Exhibit 4-3 Hazardous Materials Skills Matrix

*U.S. G.P.O.:1994-301-717:80554

Rating Scale	Individual															Required Skill
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1-Comprehensive ability to: 2-Basic ability to: 3-Partial ability to:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1. Prepare accurate shipping documents, such as, the manifest or bill of lading, in compliance with applicable regulations.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1
2. Locate the shipping documents, such as, the manifest or bill of lading, under emergency conditions.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	2
3. Accurately receive and record information pertinent to the incident, such as product information from CHEMTREC, responding unit information hazard zone determinations.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	2	2
4. Identify the hazardous material from the shipping papers and interpret any other pertinent information on the documents.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1
5. Identify hazardous materials by characteristics, such as smell, color, consistency, volatility or state.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1
6. Identify a hazardous material category from the placard displayed on the transporting vehicle.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1
7. Locate and use all available reference materials or sources to assist in incident mitigation, such as, computer services, books, periodicals, references, maps, descriptions, blue prints, and area experts.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1
8. Establish and operate a command post that effectively directs and coordinates the mitigation effort.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1
9. Assess the potential for all damages that could reasonably result from the incident within one's own area of expertise.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1
10. Assess the potential for all damages that could reasonably result from the incident in all aspects to include large scale environmental consequences.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	2	2
11. Establish the necessary actions to be taken to mitigate the incident and prioritize for one's own area of expertise.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1
12. Establish the necessary actions to be taken to mitigate the incident and prioritize for all aspects of the operation.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1
13. Identify the resources necessary to perform the identified actions to mitigate the incident within one's own area of expertise.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	1
14. Identify the resources necessary to perform the identified actions to mitigate the incident for all aspects of the operation.	3	4	5	6	7	8	9	10	11	12	13	14	15	2	2	2
15. Perform the necessary triage for victims of the incident to facilitate the effective use of available medical service.																2

For additional information, contact the Puget Sound Council of Governments, 216 First Avenue South, Seattle, Washington 98104.

Exhibit 5-1 Inspection Power Ordinance—Seattle, Washington

ORDINANCE

AN ORDINANCE relating to an amending Ordinance 1089678, the Seattle Fire Code, to provide authority to conduct regular, uniform and systematic inspections of vehicles transporting hazardous materials.

BE IT ORDAINED BY THE CITY OF SEATTLE AS FOLLOWS:

Section 1. Article 80 of the Seattle Fire Code [Ordinance 108678] is amended by adding thereto a new section designated Section 80.116, as follows:

Inspections/Vehicles

Sec. 80.116 (a) In order to determine compliance with this Article, the chief, upon presenting identification to the owner, agent or operator, is authorized to enter and inspect all vehicles, including equipment, containers and labeling therein. Rules governing the conduct of regular, uniform, and systematic inspection, entry and, where appropriate, impoundment of vehicles, shall be adopted by the chief, pursuant to Section 2.102 of this Code.

(b) For purposes of this Article "vehicles" means:

(1) every "combination of vehicles," "commercial vehicle," "motor truck," "motor vehicle," "semitrailer," "trailer," "truck tractor," or "vehicle," all as defined in Chapter 11.14 of the Traffic Code [Ordinance 108200, as amended; Seattle Municipal Code, Chapter 11.14]; and

(2) container, cargo container, tank container, and overseas van, whether or not connected to a chassis.

SAMPLE

(c) The chief shall make a record of inspection and a copy of said record shall be provided to the owner, operator or agent, or attached to the vehicle. When necessary, vehicles shall be resealed using a Fire Department seal.

(d) In the event of a violation of this article and in the event that further unrestricted movement of a vehicle may constitute a danger to persons or property, the chief may order the impoundment of such vehicle and the immediate correction of the violation.

(e) Upon the refusal of an owner, agent or operator to allow entry or inspection by the chief acting under the authority of subsection (a) of this section, the chief shall order the impoundment of the vehicle, and shall proceed to the Municipal Court of the City of Seattle and request an administrative inspection warrant to complete the inspection.

(f) Failure to comply with the order of the chief concerning the impoundment of vehicles under this section, or the failure to stop for purposes of allowing a request for inspection to be made pursuant to subsection (a) of this section, or the failure to permit inspection pursuant to a lawfully issued inspection warrant, shall constitute a crime as provided for in Chapter 12A.01 of the Seattle Criminal Code [Ordinance 102843, as amended; Seattle Municipal Code, Section 12A.02].

(g) The provisions of this section shall not limit the authority of the chief to enter and inspect vehicles if there is probable cause to believe there exists a violation of this Article therein.

Section 2. (30 day ending)

Approved:

U.S. Department
of Transportation

**Research and
Special Programs
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

Official Business
Penalty for Private Use \$300

Postage and Fees Paid
Research and Special
Programs
Administration
DOT 513

